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**Improving Product Performance
Through
New Equipment Training (NET)
Techniques**

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December 2008**

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**IMPROVING PRODUCT PERFORMANCE THROUGH NEW EQUIPMENT
TRAINING (NET) TECHNIQUES**

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ABSTRACT

The U.S. Military develops and fields infantry clothing and equipment (ICE) to protect ground warfighters against myriad environmental and man-made battlefield threats. ICE also augments physical activities to overcome identified battlefield deficiencies that will increase survivability, lethality, mobility and sustainability to improve combat effectiveness. More often than not, the maximum performance capabilities engineered into newly fielded ICE are not fully utilized to benefit the military user.

We examine the ICE training problem for the United States Marine Corps (USMC) to identify practical and strategic changes in instruction, process, and procedures to help the Marine realize the full performance potential of new ICE issued to him/her. The improved ICE training strategy recommends implementing six corrective actions, which collectively increase Marines' ability to notice ICE training, improve their ability to understand its training message, and reinforce newly gained ICE knowledge to habitually use ICE correctly. The training approach principles should be applicable to the United States Army whose Soldiers similarly experience under utilized capabilities from their combat clothing and equipment.

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LIST OF ACRONYMS AND DEFINITIONS

Term or Acronym	Definition
PP&O	Policy, Programs and Operations at Headquarter, Marine Corps
POI	Program of Instruction
POM	Program of Memorandum
SBI	Standards Based Instruction
Sgt	Sergeant; mid level enlisted; squad leader
SgtMaj	Sergeant Major; senior enlisted rank
SMMC	Sergeant Major United States Marine Corps; the most senior enlisted Marine
SNCO	Staff Non Commissioned Officer; enlisted rank staff Sergeant through Mastery Gunnery Sergeant and Sergeant Major
SOI	School of Infantry; Marine Corps has two schools, Camp Lejeune NC(East) and Camp Pendleton CA (West)
SSgt	Staff Sergeant
Theatre	Region of combat missions
T&R	Training and Readiness
TBS	The Basic School; first school officers attend after basic training at Officer Candidate School
USMC	United States Marine Corps

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I. INTRODUCTION

A. BACKGROUND ABOUT INFANTRY CLOTHING AND EQUIPMENT (ICE) PROBLEMS

The U.S. Military develops and fields infantry clothing and equipment (ICE) to protect ground warfighters against a myriad of environmental and man-made battlefield threats, including augmenting physical abilities, e.g., load carriage. Specifically, the military invests in new ICE to overcome identified, battlefield human deficiencies and to increase warfighters survivability, lethality and mobility. Military planners and combat developers realize the force multiplier effect generated through hundreds of improvements to soldiers clothing, field equipment, and technological enhancements. Dramatically improved soldier safety and quality of life directly supports and enables national military strategy on an individual and unit level. Even so, maximum performance capabilities engineered into newly fielded ICE are often not understood or utilized, presenting crucial training and operational challenges at the ICE – user interface.

When professionals in the acquisition community are asked why ICE appears to be systematically under utilized, the near unanimous response is that “It is a training issue.” Yes, that is partially true, but underutilized ICE and its associated user dissatisfaction is cutting into mission accomplishment, often becoming quite personal, e.g., “I hate this helmet.” Interviews with military trainers and commanders relate how new warfighters often appear unable to use the gear properly.^{1 2} One of this study’s authors has ten years experience in developing and fielding ICE. She has found problems with improper use, lack of interest in reading instructions, unawareness of adjustment features, and some cultural negativity about ICE that appears sometimes flow down from staff non- commission officer (SNCO) leadership.

¹ D. White, G. Camina, A. Abrams, B. Brooks, L. Lowe, B. Williams, and H. Alonzo, 2007, Interview by D. Townes, Tape recording, April 17, School of Infantry – East, Camp, North Carolina.

² J. Durrant, 2008. Interview by D. Townes, Telephone, April 18.

Warfighter dissatisfaction with military ICE performance leads military units and individuals to purchase commercial items to replace their military issue items. A 2000 military research survey investigated the acceptability of military clothing and equipment. The survey found Army soldiers purchased 50% and 80% of commercial outdoor clothing and equipment for field use, respectively, and concluded “if money were not a limiting factor, this propensity to purchase would increase.”³ A representative from just one of many well known outdoor retailer estimates \$2 million dollars of ICE is sold annually to the military.⁴

Most ICE items fielded are the same or comparable to commercial off the shelf (COTS) products, except they are modified to perform more reliably during military use conditions. The modifications are made to achieve equipment compatibility, acceptable durability, removal of non-value added features and branding, and change to a tactical color or camouflage pattern. The survey found the unmodified commercial items were rated highly for “latest designs, technology, comfort and quality.”⁵ Conversely, the survey reported military issued gear lacked the “latest developments and innovations, and reflected poor quality.”⁶ The dichotomy in user acceptance between the locally purchased COTS and the issued militarized COTS versions may be partially overcome by improved training.

Finally, at initial inspection, most Marines and Soldiers believe they can effectively use ICE items without instruction due to recognition of the item and purpose, experience with something similar, intuition, and trial and error. This “curse of knowledge”⁷ and the user opinion “it is so easy a cave man can do it”⁸ applies to both

³ D. Marshall, R. Bell, and J. Johnson, 2000, *Brand New: An Exploratory Study into The Role of Branding On Military Clothing Acceptability* (report) U.S. Soldier and Biological Chemical Command.

⁴ D. Ruiz, 2008, Interview by D. Townes, Telephone, August 1.

⁵ D. Marshall, R. Bell, and J. Johnson, 2000, *Brand New: An Exploratory Study into The Role of Branding On Military Clothing Acceptability* (report) U.S. Soldier and Biological Chemical Command.

⁶ Ibid.

⁷ J. Suchan, 2007, “What Makes Ideas Stick” Lecture in Communication for Managers/MN 3012. Naval Postgraduate School.

⁸ Martin Agency for Government Employee Insurance Company, 2007, Tagline for GEICO Insurance Television Advertisement.

Marine and Army infantry components. Consequently, fundamental changes that enable infantry to notice the value of ICE training should lead to better understanding and proper use of ICE to benefit ground combat elements.

B. PROJECT PURPOSE

This Joint Applied Project examines the ICE training and adoption issue to identify practical changes in instruction, process, and procedures to eventually help Marines realize the full potential of new ICE. The traditional Marine Corps creed of *fight as you train* points directly toward ICE. Specifically, this research investigates the following areas:

- Investigate possible causes for shortcomings in ICE training, and identify the constraints and practices of the triad -- materiel developer, military training environment, and operating forces -- associated with ICE capabilities.
- Examine the influence of the USMC demographics, training schedules, and readiness expectations on ICE training effectiveness.
- Evaluate adult learning tools and media to determine what approach should be made to update the current Korea War era training material that will appeal to the generational characteristics of the current USMC population.
- Consider the role and contribution of leadership to reinforce and enforce proper use and maintenance of ICE to improve their troops' combat effectiveness.

C. SCOPE AND METHODOLOGY

The United States Marine Corps (USMC) was selected for this study given it is a smaller, more manageable and centralized defense organizational structure. Furthermore, the USMC enabled us to more easily interview subject matter experts who work in jobs related to fielding and training new ICE. These characteristics made the Marine Corps a suitable population for the project's scope and time constraints.

We also expect our analysis, conclusions, and recommendations identified in this report can also benefit the U.S. Army probably facing a similar situation of systematic under utilization of ICE capabilities. Interviews with U.S. Army personnel who develop and survey ICE find they encounter similar training issues difficulties as the Marine Corps. The Army Solider System Center (SSC) develops ICE for the Army ICE Program Manager. SSC Operational Forces Interface Group (OFIG) identifies issues with Army ICE capability issues regularly from their hot line that is available for soldiers to place inquiries and complaints on SSC products. OFIG visits six to eight Army installations per year to survey soldiers directly on equipment acceptability and product improvements, and conducts New Equipment Training (NET) and Train the Trainer instruction for newly fielded items. The OFIG Team Leader, a former infantry soldier and instructor, concludes “Soldiers do not get taught (ICE) at Advanced Individual Training and time is not taken at initial issue to train the equipment. Soldiers learn by experience and guidance from good squad and platoon leaders.”⁹ Army soldiers’ dissatisfaction with military ICE is a reflected in the 2000 research survey previously mentioned.

Our research methodology encompassed the following:

- Interviews were conducted with subject matter experts responsible for hands-on training of new entrants, training policy and program of instruction implementation, and military leadership to understand the culture and organizational dynamics that can be leveraged to benefit NET.
- Documenting and mapping patterns of the acquisition process, manpower statistics, and career progression and responsibilities were examined as they relate to training needs.
- A literature review of academic and government research was conducted pertaining to adult learning and the message characteristics catching a person’s attention and message imprinting.

⁹ M. Beila, 2008, Interview by D. Townes, Tape recording. August 19, 2008. U.S. Army Natick Soldier Research, Development and Engineering Center, Natick, MA.

D. DOCUMENT ORGANIZATION

The study is presented in seven chapters. The chapters following this introduction are summarized below.

Chapter II provides background to explain the organizational functions and interrelationships that influence New Equipment Training (NET) given they are interlaced in the data and analysis presented in subsequent chapters. The background also synthesizes the key literature review of cohort generational characteristics and how it affects learning styles, describes how the placement and style of message will affect if the message is noticed, and discuss ways to make concise messages stick.

Chapter III investigates the ICE development and training environments to understand the factors affecting preparation and delivery of training information that contribute to ineffective NET.

Chapter IV addresses factors that influence the Marines likelihood of noticing training information when it examines generational differences within the Marine population, and timing elements affecting the availability of the right information at the right time with the right equipment that supports the creed to “train as you fight.”

Chapter V discusses preparing military ICE training instruction and its delivery to increase understanding and avoid conflicting interpretations of its meaning.

Chapter VI addresses activities to increase the likelihood that Marines will act upon the revised NET and benefit from maximum ICE capabilities.

Lastly, Chapter VII draws conclusions from the presented data and analysis and recommends practical actions. The actions are aligned with the environmental constraints where revised NET must require little to no increase in training time and be affordable to institutionalize. Implementing the recommended actions is expected to achieve more effective NET to increase Marines understanding and using maximum ICE capabilities to improve performance, safety, and survivability on the battlefield.

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II. BACKGROUND

This project analyzed making practical changes to existing processes and procedures to improve infantry combat equipment (ICE) training, e.g., ICE includes infantry Marine clothing and personnel equipment and excludes individual weapons. The point is to systematically improve ICE utilization, to attain the maximum engineered capability from all relevant items. Many of these items are currently being under-utilized, which affects mission. This chapter summarizes literature applicable to increasing a Marine's ability to learn from an improved training approach. Also, two organizations involved in developing and fielding ICE capabilities were examined to ascertain potential training improvements. Since the same organizations are repeatedly referenced in this study, their relationship to new ICE is also described. Additionally, the Marine creed that "Every Marine is a Rifleman" is used to better understand the preeminence of infantry training as the penultimate combat skill required of all Marines involved in the Corps' expeditionary mission. Additionally, because ICE usage and training is affected by cognitive ability, cognitive characteristics that influence learning are addressed.

A. MISSION AND ORGANIZATIONAL INTERRELATIONSHIPS

The following organizational acronyms are referred to throughout this project: MARCORSYSCOM, PM- ICE, MCCDC, SOI, OCS and TBS. We next explain how the roles within these organizations are interrelated and associated with fielding or training new ICE equipment.

MARCORSYSCOM: The Marine Corps Systems Command (MARCORSYSCOM) serves as the Commandant of the Marine Corps (CMC) principal agent for materiel acquisition and sustainment of systems and equipment used by the Marine Operating Forces to accomplish their expeditionary military mission. The command outfits Marines with literally everything they drive, shoot and wear.¹⁰

¹⁰ "Project Team Leader's Pocket Guide," 2007, Marine Corps Systems Command (version 1.3).

MARCORSYSCOM listens to warfighters to determine their perspectives for developing and utilizing specially developed military gear. MARCORSYSCOM creates and resources the Program Manager office to execute distinct portions of its mission related to a specific system and equipment. For example, PM Motor Transport was established to concentrate on acquisition and life-cycle management of tactical wheeled vehicles for the Marine Corps versus PM Ammunition mission to conduct research, development and acquisition of all conventional ground ammunition required by the Marine Corps.¹¹

PM-ICE: The Program Manager-Infantry Combat Equipment (PM-ICE) is responsible for MARCORSYSCOM's human Marine platform system. PM-ICE is responsible for the lifecycle management of protecting and enhancing Marine performance with clothing and individualized equipment. Life cycle management includes developing, acquiring, fielding, sustaining and phasing out Marines' clothing and equipment items over the items' service life. The product line totals approximately 350 items.¹²

The clothing products include all environmental protective clothing, handwear, footwear and headgear to protect the Marine against prolonged exposure to all weather conditions: extreme cold to desert climates and proximity to man-made flame hazards. The equipment products include the suite of infantry armor for the torso, head, ears, eyes and limbs against fragmenting munitions effects as well as handgun, submachine gun and assault rifle rounds. Equipment also includes a modular load carriage and hydration systems to sustain the Marine in various missions. Finally, ICE includes myriad general support equipment such as sleeping systems, flashlights, entrenching tools, bayonets, compasses, over snow and ice movement equipment such as skis, snow shoes, and climbing gear etc. to operate in the mission environment better and longer than the

¹¹ Marine Corps Systems Command, <http://www.marcorsyscom.usmc.mil/> (accessed October 15, 2008).

¹² D. Fitzgerald, 2008, Interview by D. Townes, Telephone, July 29, PM-ICE Overbrief Briefing.

enemy. A Marine does not carry all ICE at all times, but selects and configures the suite of items needed to complete the mission. The figure below depicts the myriad items needed to protect themselves and to accomplish their mission.¹³



Figure 1. Marine as a System

Separate ICE items must be designed so they are physically compatible with and do not degrade other ICE or other warfighting operating systems such as weapons, vehicles, communication, etc. A few examples of integration are: ability to operate the weapon and communication equipment with gloves, acquire targets while wearing helmet and protective eyewear, and stealth movement to contact the enemy and attack. ICE must be as light weight as possible yet durable to be reliable in rugged field use and repeated cleaning. Furthermore, ICE must be ergonomically designed in the fewest number of sizes that will fit the body shapes of the 5th to 95th percentile Marines, repairable with standard parts and equipment easy to use, affordable, and domestically available.

¹³ D. Fitzgerald, 2008. Interview by D. Townes, Telephone, July 29, 2008. PM-ICE Overbrief Briefing.

MCCDC: Specific ICE capabilities are driven by a push / pull requirement process. Requirements are “pushed” from Marine Corps Combat Development Command (MCCDC) to overcome battlefield shortcomings the Operating Forces identify that reduce their combat effectiveness. PM-ICE “pull” requirements from MCCDC when PM-ICE identifies new technologies and/or commercial products that MCCDC agrees will provide a significantly enhanced performance of fielded items

Requirements define task, conditions, performance, physical limits, interfaces, fit and reliability. Each specific requirement is listed with a minimum requirement that is defined as a “threshold” and a desired requirement that is defined as an “objective.” For example, the new sleep system must meet the threshold requirement to protect the Marines so he can obtain four hours of uninterrupted sleep at 20 degrees Fahrenheit, while the objective requirement reduces the temperature further to get four hours sleep at 0 degree Fahrenheit. New ICE is not adopted unless all threshold requirements are met or exceeded. Objective requirements are typically pursued in the future as a product improvement when advanced technology becomes available.

TECOM: The Training and Education Command (TECOM) is responsible for developing, coordinating, resourcing, executing, and evaluating training and education concepts, policies, plans and programs to ensure Marines are prepared to meet the challenges of present and future operational environments.¹⁴ New equipment training (NET) is a partnership between MARCORSYSCOM/PM and the Training Command of TECOM.

Chapter III explains how MARCORSYSCOM is responsible for formulating NET during item development. TECOM must approve NET training to ensure it can be implemented by their training schools and program of instruction. MARCORSYSCOM furnishes the first two years of training material to TECOM and TECOM maintains it thereafter. The school’s that train Marines are subordinate activities of TECOM.

¹⁴ United States Marine Corps Commands, TECOM. <http://www.usmc.mil> (accessed September 22, 2008).

SOI: TECOM's School of Infantry (SOI) is the first school all enlisted Marines attend after successfully completing basic training at the Marine Corps Recruit Depots (MCRD). There are two SOI locations: East at Camp Lejuene, NC and West at Camp Pendleton, CA. SOI trains enlisted Marines to serve in combat as riflemen, infantrymen, and infantry leader to provide the Marine Corps with the war fighters that will win our nation's battles.¹⁵ While enlisted recruits have earlier exposure to some ICE in basic training, this exposure is not investigated in this study since equipment training pales in priority to MCRD's purpose of transforming young civilians into fully capable Marines.

OCS: TECOM's Officer Candidate School (OCS) is located in Quantico, VA. This school provides basic training for officer candidates and is the counterpart to MCRD for enlisted Marines. The mission of OCS is to educate, train, evaluate, and screen officer candidates to ensure they possess the moral, intellectual, and physical qualities for commissioning, and the leadership potential to serve successfully as company grade officers in the Operating Forces.¹⁶ Unlike MCRD, OCS was viewed as a training environment opportunity given the intellectual capabilities and performance expectations of these Marines who are three to seven years older than their enlisted counterparts, have a college degree, and may even have enlisted Marine experience. Also, their upcoming leadership responsibility as a platoon leader requires understanding and role modeling of ICE.

TBS: TECOM's The Basic School (TBS) is located in Quantico, VA. TBS is the first school officers attend after OCS and is the counterpart to SOI for enlisted. TBS trains newly commissioned or appointed officers in the high standards of professional knowledge, esprit-de-corps, and leadership required to prepare them for duty as company grade officers in the operating forces, with particular emphasis on the duties, responsibilities and warfighting skills required of a rifle platoon commander.¹⁷

¹⁵ United States Marine Corps Commands, Mission Statements for TECOM and its subordinate schools, <http://www.usmc.mil> (accessed September 22, 2008).

¹⁶ United States Marine Corps Commands, Officer Candidate School Mission Statement, <http://www.usmc.mil> (accessed September 22, 2008).

¹⁷ United States Marine Corps Commands, The Basic School Mission Statement, <http://www.usmc.mil> (accessed September 22, 2008).

B. ICE TRAINING APPROACH CAN REINFORCE MARINE CORPS RIFLEMAN’S CREED

“No new Marine escapes the Rifleman’s Creed. Every Marine is trained first and foremost, as a rifleman, for it is the rifleman who must close with and destroy the enemy. The rifleman remains the most basic tenet of the Marine Corps doctrine. Every new Marine in training must memorize the creed and live by it.”¹⁸ It is believed the creed was coined by USMC Major General Rupertus, after the Pearl Harbor attack in 1941. Approximately 20 years ago, General A. M. Gray, 29th Commandant of the United States Marine Corps (1987-1991), revived the rifleman creed and expected it to be embraced Corps wide.¹⁹ General Gray added, “all other conditions are secondary,” meaning all Marine warfighting activities revolve around the rifleman: all other Marine assets--aviation, armor, artillery and supporting arms--exist to support the rifleman.”²⁰

The rifleman creed relates to this study because every Marine is trained as a rifleman and is clothed and equipped for combat to enable proficiency in this fundamental role. This creed is a foundation capability in Marine Corps Vision and Strategy 2025 where General Conway, Commandant, “believes the individual Marine in the most formidable weapon on today’s battlefield.”²¹

C. LITERATURE REVIEW

This section summarizes and synthesizes research studies that were evaluated to understand what may be driving Marines’ ability to notice characteristics of Infantry Combat Equipment. After this first crucial step – itself imprinted differently per generation – then noticed information must be understood and applied. Ultimately, the

¹⁸ M. Sturkey, 2001, except from *Warrior Culture of the U.S. Marines*, Heritage Press, http://www.usmcpres.com/heritage/marine_corps_rifleman's_creed.htm (accessed September 22, 2008).

¹⁹ J. Obrien, 2007, Interviewed by D. Townes, September 2007, Program Manager Infantry Combat Equipment.

²⁰ M. Sturkey, 2001, except from *Warrior Culture of the U.S. Marines*, Heritage Press, http://www.usmcpres.com/heritage/marine_corps_rifleman's_creed.htm (accessed September 22, 2008).

²¹ United States Marine Corps Commands, Vision & Strategy 2025, <http://www.usmc.mil> (accessed September 22, 2008).

dominant culture can reject, or accept; an indicator would be the final behavior of Marines teaching Marines, e.g., the right equipment, the right fit for the right purpose, upfront in the complex training process.

1. Method of Research:

All searches initiated with Google and Google Scholar topic searches and progressed into related internet articles or books. Topic searches provided several books and articles that were reviewed for content and relevance. When articles were close to the subject matter but not totally relevant, the articles' references were reviewed for possible additional sources. No military articles were located to be utilized in the literature review. We found that the industry and academic information we retrieved was relevant and transferable to the Marine training environment.

Next, we provide an overview of the literature we read to supply a general theoretical context for the interview data we gathered. Subsequent chapters also refer to the literature in detail sufficient for analyzing our interview data.

a. Noticing Training Material in the Workplace

In a multigenerational workplace, it is reasonable to assert that skilled managers identify and utilize the unique characteristics of individuals and team members to maximize unit and professional performance. Today's workplace consists of four generations: Veterans, Baby Boomers, Generation X, and Millennials or Gen Y. Sometimes the term Nexters is used for younger Millennials. Common knowledge indicates that each generation has somewhat unique wants, needs, and motivators. In *Generation at Work* (2000), Zemke, Raines and Filipczak defined the four generations and explored the problems, pressures, and opportunities of the mixed generation workforce and workplace. *Generations at Work* also profiled how generational influences can affect how the multi-generations perceive each other and how they perform in the workforce. This work also explored the generational personalities, core values, and career assets, liabilities and motivators of today's workforce.

Susan El-Shamy utilized the basic definitions and work characteristics identified in *Generations at Work* and developed a training guide for the younger generation and their trainers in *How to Design and Deliver Training for the New and Emerging Generations* (2004). El-Shamy identified the general characteristic of potential trainers for all generations and then tied them to the technological and generational learning differences. *How to Design and Deliver Training for the New and Emerging Generations* explored the “basic learning styles” of the Baby Boomer and Generation X. It developed training techniques to engage all generations while providing tools to engage and maintain the interest of the younger generations.

Both Zembe and El-Shamy stressed the importance of technology to the Millennial generation in the workplace including training. Shamy also explained that all generations are most comfortable with the learning approaches not too different from those used when they were young. In *Falling through the Net: Defining the Digital Divide* (1999), Assistant Secretary for Communications and Information, Larry Irving, presented the percentage of U.S. Households with Computers from 1984 to 1998. Even though this data might appear dated, the older members of the Millennial Generation were four years old when the first survey was taken indicating the Millennial generation was the first generation to grow up with computers in both their classrooms and homes. This one huge factor enabling the Millennial generation to notice and process information particularly when presented in the form of video games or integrated with other computer technology.

b. *Understanding Training Instructions*

To improve Marines understanding of information once it is noticed, we investigated strategies to enhance their ability to understand the message. In *Questions and Answers on Adult Education* (2002), Mercer and Seybold stated “it is important that the participants consider the learning as not only relevant to the organization, but also relevant to their own growth and development.” This led us to investigate adult learners, their special needs and requirements. Dina Abbamondi compiled a list of “adult learning

strategies” where special needs and requirements were identified. Abbamondi also stated that to ensure learning occurs, motivation, reinforcement, retention and transference must be incorporated in instruction.

In the Research and Theory section of *Individualizing Instructions: Making Learning Personal, Empowering and Successful*, (1990), Hiemstra and Sisco presented an article entitled “Moving from Pedagogy to Andragogy” that described the overall concept of andragogy as an alternative model of instruction to improve adult teaching. Dr. Karen Jarrett Thoms’ paper *They’re Not Just Big Kids: Motivating Adult Learners* (n.d.), defined the differences of adult learners versus children learners, andragogy and pedagogy respectively. Thoms’ listed the principles of adult learning and characteristics of adult learners, and defined six implications for developing effective training programs based on “understanding of adult learning.”

Vicky Lara (2007) created a professional development module entitled “Learning Theory and the Adult Learner.” The module presented different learning theories, approaches and definitions pertaining to adult learning. Finally, the internet.cybermess.com website included William H. Jackson’s (1998) “Adult vs. Child Learning” that compares pedagogy and andragogy attributes in a chart format.

c. Acting on the Understood Information

Once the message is presented and understood, participants must be able to retain the information or “get the message to stick.” In *Food for Thoughts’ - What makes management message stick; Scientific study into how the brain works has revealed how best to provide people with information and help them retain it*, Blackham presented findings on how people absorb and retain information. By looking at the brain chemicals, Blackham “learned conclusively,” the percentage of people that will absorb information visually, by physical movement or by listening. Blackham identified the types of information that go from short-term memory to working memory and how the brain rates the importance of the message. Blackham also revealed factors comprising effective management communication. Heath and Heath presented six principles that could help make the information stick once the message is noticed in *Made to Stick*:

Simple	Provide the core of the idea and keep it simple
Unexpected	Engage people's attention by surprising them
Concrete	Explain ideas in terms of human action and sensory information
Credibility	Make the idea believable
Emotion	Help people see and feel the importance of an idea
Stories	Mentally simulate the listener through narration

D. SUMMARY

This chapter provided a brief foundation explaining Marine Corps organizational functions particularly in light of the importance of the Marine Corps Rifleman's Creed. In addition, the chapter summarized industry and academic research relevant to enhancing Marines abilities to better notice and correctly utilize Infantry Combat Equipment capabilities. This overview of books, articles and papers also provides a theoretical context and basis of analysis for subsequent interview data we gathered for this study.

In Chapter III, we investigate the development and training environment of Individual Combat Equipment to the Marine Corps. We outline the acquisition challenges experienced by PM-ICE when purchasing and fielding new ICE and MARCORSCOM training requirements are outlined. Finally, we present three NET cases synopsizing training issues on critical combat gear.

III. FACTORS INFLUENCING THE EFFECTIVENESS OF ICE NEW EQUIPMENT TRAINING (NET)

USMC New Equipment Training (NET) requires two fundamental sequences: preparing training material to determine how to use the item successfully, and deliver training material that the user will understand and use in the future. This chapter examines these two sequences to identify factors within current ICE practices that may contribute to NET ineffectiveness.

A. ICE FIELDING CHARACTERISTICS AND ACQUISITION CONSTRAINTS

ICE fielding characteristics and constraints are provided that dictate how the USMC satisfies military needs and mandates.

1. ICE Acquisition Characteristics

Until about 1990, the Marine Corps utilized Army ICE with the expectation that the same items can satisfy both services' infantry missions. Over the last 18 years, a PM-ICE mission has grown to address USMC Commandants' initiatives and Operating Forces demand for infantry modernization to execute its expeditionary "force in readiness"²² military obligation. New ICE fielding characteristics are listed below to illustrate the scope of new ICE fielding since post September 11, 2001.²³

ICE Fielding Characteristics

Annual New ICE Adopted: 12 to 15 new ICE items are adopted annually as either new added capabilities (e.g., armor plates) or next generation improvements (e.g., load bearing equipment).

²² United States Marine Corps Commands, Vision & Strategy 2025, <http://www.usmc.mil> (accessed September 22, 2008).

²³ D. Fitzgerald, Interview by D. Townes, Telephone, July 29, PM-ICE Overview Briefing.

<u>ICE Fielding Duration:</u>	Establishing Full Operational Capability (FOC) requires fielding approximately 200,000 of each new ICE item to position inventory across the USMC to support combat readiness. Two to three years is typically required to accomplish FOC when the PM secures supplemental funds. This fielding period doubles if funding is solely dependent on programmed core funds.
<u>Annual FOC Investment</u>	PM-ICE average annual expenditure is \$325M to \$350M to support FOC fielding. Approximately 85% of the funds are supplemental appropriations, and 15% are combined funds from programmed core funds and congressional earmarks in about equal proportions.
<u>ICE Service Life</u>	Typical service life for each new ICE capability is 12 to 15 years before it is replaced with an upgrade.
<u>ICE Sustainment Rate</u>	USMC operational units bear the sustainment cost to maintain ICE inventory to support their missions. The average repair/ replacement rate is 20% of the FOC quantity per year (under hard training conditions since post 9-11). At a 20% replacement rate, the initial FOC quantity will be replaced in 5 years. Therefore, USMC will consume three times the initial FOC fielded quantity over an estimated 15 year ICE service life.

2. Acquisition Constraints

The most challenging constraints experienced by the PM-ICE are limited time to complete its acquisition activities, and an uncertain funding stream to accomplish fielding because of the dependence on supplemental funding.²⁴

An average of 24 months is typically allowed to begin fielding a new ICE capability. The first 18 months is used to develop a suitable design, validate its performance through laboratory and field evaluations, receive approval from the MARCORSYSCOM decision authority, and award a production contract. The next six months is required to reach the first delivery from the production contract to begin fielding.²⁵ This acquisition schedule is driven by two forces that create the PM's timing and funding constraints.

1) Customer Force. Marine Operating Forces identify capabilities they require to overcome a battlefield deficiency that limits their combat effectiveness. The Operating Forces will obtain commercial ICE capabilities directly themselves if PM-ICE does not respond fast enough due to the USMC operational tempo to meet its military obligations.²⁶

2) Budget Force. PM-ICE relies on 85% of its budget from supplemental Operation and Maintenance funding (O&M) to field ICE over a 24 to 36 month period.²⁷ O&M funding is a one year authorization and appropriation, and it is not approved until the year of execution. These funds cannot be extended, will be lost if not spent, and future year funding levels will be reduced if a prior year's funds are not fully obligated. Timely obligation of these funds is challenged by

²⁴ D. Fitzgerald, Interview by D. Townes, Telephone, July 29, PM-ICE Overview Briefing.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Ibid.

the length of time needed to satisfy competitive contract regulations with limited contracting personnel resources, and limited availability of suitable pre-positioned contract vehicles.²⁸

3. Fielding and Acquisition Constraint Analysis

We next analyze the level of ICE financial investment to understand the relevance of training for increasing return on investment, and consequences associated with ICE acquisition constraints.

a. Nominal Annual Cost o Fielding ICE Over Its Service Life

The delineated ICE fielding characteristics illustrate the breadth of USMC investment in new ICE capabilities. We believe it is useful to understand the costs USMC incurs to initially equip units and sustain each ICE item fielded over its service life. Given that ICE unit prices vary widely due to item complexity, we are limited to establishing an average cost range; however, we think this range may be helpful for appreciating the level of ICE investment. The cost derivations are provided in Appendix A. where we find the PM invests an average of \$65 M to \$87.5 M to equip the Operating Forces with initial FOC for each ICE introduced. From this value we can further calculate the USMC's life cycle cost of \$195 M to \$264 M required to fund each ICE over its 15 year service life. The investment for each new ICE capability is significant; however, the capabilities it buys are under utilized. Our premise is that more and better usage of maximum ICE capabilities can be substantially improved by increased focus and improved NET. This monetary value alone warrants effective training to maximize return on investment, and does not factor in the value of Marines safety and survivability. Cost and return on investment alone supports serious consideration of fundamentally aligning ICE with Marine Corps doctrine and new equipment training.

²⁸ D. Fitzgerald, Interview by D. Townes, Telephone, July 29, PM-ICE Overview Briefing.

b. *Consequences of Not Complying with Acquisition Constraints*

A reasonable assumption is that increased time and funding would benefit the development of ICE capabilities. Increasing time and funds would allow developers to better understand specific failures and conditions, investigate more alternative solutions, test longer and in multiple environments to predict operational reliability, identify where further improvements are needed, and retest to determine if improvements are achieved. However, two negative consequences will occur if the PM ignores timing and funding constraints to achieve these benefits.

1. Combat Effectiveness Consequence. If PM-ICE is not responsive to the Operating Forces, they can acquire commercial ICE items themselves, creating problems with equipment interoperability and accountability, including: building-in systemic life-cycle problems around the appropriateness of ad hoc equipment, sustainability for repair and replenishment, reliability variations and shortcomings in the field and reduced scales of economy for military issued items. On the other hand, if Operating Forces do not have funding available to procure commercial items, they are compelled to use ICE with battlefield shortcomings.

2. Funding Consequence. DoD budget analysts compare actual obligations and accomplishments verses what was planned in prior years. Analysts expect that planned activities equal actual accomplishments. Analysts use this comparison as an indicator that the PM's new budget is sound and reflective of competent resource stewardship.^{29 30} Therefore, if the PM has unsuccessful funding obligations in one year because of incomplete planned acquisition activities, it will result in an unfavorable budget review and reduced funding for the next year.^{31 32} The impact

²⁹ D. Doyle, 2008, Lecture in Resourcing National Security, Policy & Process, MN3172, Naval Postgraduate School.

³⁰ A. Wildasvsk and N. Caiden, 2004, *The New Politics of the Budgetary Process*, Chapter 3, Person/Longman, New York.

³¹ D. Doyle, 2008, Lecture in Resourcing National Security, Policy & Process, MN3172, Naval Postgraduate School.

³² A. Wildasvsk and N. Caiden, 2004, *The New Politics of the Budgetary Process*. Chapter 3, Person/Longman, New York.

of reduced funds causes either the fielding of fewer items at the current rate, or buying the current number of items per year and fielding them at a slower rate. In either instance, combat readiness of Marines is reduced because of reduced availability of equipment capabilities. Lower funding also negatively impacts production. The PMs having to procure a smaller volume of items increases unit cost due to reduced economy of scale, including shorter or interrupted production runs which can reduce quality due to learning curve effects.

B. MARCORSYSCOM TRAINING REQUIREMENTS

New Equipment Training (NET) preparation is a logistics element within the acquisition process. Training is grouped with its interrelated Manpower and Personnel domains, and addressed under Human Systems Integration per DoD 5000.2 E7 requirements as Manpower, Personnel and Training (MP&T). While the complete MP&T is cited throughout this section, its reference is focused exclusively on training. The most pertinent elements of MARCORSYSCOM's MP&T policy for this study are MP&T analysis and planning, and NET delivery requirements per established guidelines.

1. MP&T Analysis and Planning

The foundation to the MARCORSYSCOM's MP&T process lies in completing the MP&T analysis tool that can be found in Appendix B. The tool requires the product engineer's input to a series of questions relative to the new capability requiring training. The outcome of this input defines the gap existing between the legacy and new item. This gap enables the product engineer to understand the complexity and resources needed to train the new item.

A scoring scheme is associated with each question in the tool where a numerical value is assigned to the choice of a Yes, No, Unknown or Not Applicable answer. The aggregate score identifies one of three training risk levels. Each risk level identifies the scope of training analysis required to gather data needed to set up the training plan that is prepared in the next phase. The training plan is used to guide the various activities to prepare the training. When analysis is required, MARCORSYSCOM advocates it be

conducted by an outside source with expert training knowledge. An explanation of each risk and its corresponding level of analysis are listed in Table 1 below³³, where the higher the score, the more extensive the analysis needed to generate data for training plans and preparation.

Table 1. Training Analysis Determination

MP&T Tool Score	Training Risk	Training Analysis
0 – 15 points	Minor	Data exists and is readily available to prepare training plan. No outside analysis required
16 – 30 points	Moderate	Complete data is not available where gathering data in targeted areas is required. Partial analysis is recommended before proceeding with planning training.
Greater than 30 points	Major	Insufficient data is available or non-existent to enable a training plan to be prepared. Full Analysis is required to prepare the necessary training plan.

The MP&T process has programmatic schedule and cost implications. MARCORSYSCOM estimates \$15K is required for completing the analysis tool, and an average of \$150K to \$200K is required to complete a full MP&T analysis and plan³⁴. The PM is responsible for funding and scheduling this activity into their program management plan to support NET preparation.

2. New Equipment Training (NET) Guidelines and Deliverables

MARCORSYSCOM defines NET as the initial transfer of knowledge and skills on the operation and maintenance of a new or improved system at fielding. It trains the

³³ R. St. Amour, 2008, “Manpower, Personnel & Training Process Overview,” Presentation, Product Group 13 Infantry Weapon System Command, Marine Corps Systems Command.

³⁴ R. St. Amour, 2008, Interview by D. Townes. Tape recording, May 4, Program Manager- Infantry Weapons, Marine Corps Systems Command, Quantico, VA.

“delta” of knowledge, skills and abilities to experienced operators of the legacy item.”³⁵
 Table 2 delineates the factors that MARCORSYSCOM requires be addressed to formulate effective NET.³⁶

Table 2. NET Characteristics and Requirements

NET Characteristic	Requirement
Scope	System complexity Safety/Operational Risk Target audience (who, number, location) User skill level Individual tasks or crew tasks Available resources (money, personnel, time)
Who receives	Operating Forces Instructors (NET Team, Formal Schools) Key Personnel (support personnel)
When needed	Developmental and Operational Testing Fielding of new systems Configuration changes to legacy systems Sustainment training to maintain readiness; individual or collective which is a unit commander’s responsibility.
Training Material Provided	Two to three years of formal instruction as applicable: Draft Training Standards (T&R Events) Training Materials (Master Lesson Files) Training Aids (models, mock-ups) Training Devices (Simulators) Interactive Courseware

MARCORSYSCOM acquisition policy assigns the responsibility of preparing and delivering NET to its PMs. Training material must be developed in accordance with USMC Standards to facilitate efficient integration into the Training and Education Command’s (TECOM) existing Program of Instruction (POI).³⁷ Moreover, TECOM

³⁵ R. St. Amour, 2007. “Planning for New Equipment Training,” February. Presentation to Marine Corps System Command.

³⁶ Ibid.

³⁷ Ibid.

must approve the training approach to ensure it can be implemented in their schools.³⁸ Formulating a suitable NET approach is typically accomplished in collaboration with the school(s) it impacts.

3. MP&T and NET Analysis

The MP&T policy establishes the PM organization is responsible for formulating and preparing the training materials for the training schools, which is our study is PM-ICE. The MP&T process shows that PM-ICE must coordinate with TECOM to be sure the training material is compatible with their POI so that it can be readily implemented at the appropriate school. We identify two shortcomings in executing these policies relative to ICE acquisitions.

The MP&T planning process is not compatible with ICE program schedule and funding constraints. The planning and analysis requires an estimated 1.1 man-year effort that corresponds to an average minimum cost of \$165 -\$215K. These costs represent approximately 50% of a typical ICE program schedule and funding, and are not supportable given the combat effectiveness and funding consequences previously mentioned. While the MP&T level of effort is not supportable for an individual ICE program, we see its merit for the family of ICE to formulate an overarching standardized training approach. A standardized ICE training approach would simplify training preparation and execution for each new ICE item. It would limit the product engineer's focus on unique capabilities of the new item within a pre-determined format and implementation strategy.

NET identifies training for the large group of "Operating Forces" and expects the user to be experienced with a legacy item, which is not always the case with ICE. To prepare effective ICE NET, we recommend a distinction between new entrants and experienced Marine. We define "new entrants" as the new Marine students who are trained first as an infantry rifleman in a school setting prior to the Military Operational Specialty (MOS) training. We define Marines in the Operating Forces as "experienced"

³⁸ R. St. Amour, 2007. "Planning for New Equipment Training," February, Presentation to Marine Corps System Command.

with a MOS designation, and are self taught on how to use new ICE. Each Marine needs to understand the same message about ICE capabilities, but we envision that the media format and delivery of the training material will differ. Differences in training materials will be discussed in Chapters IV and V.

C. ICE NET PRACTICES

PM-ICE does not implement the breadth of MARCORSYSCOM training requirements due to time and cost constraints. However, ICE NET is not ignored when we reviewed ICE NET examples from PM-ICE. We find the level of instruction corresponds directly to item complexity.

Findings from USMC's recent Modified Tactical Vest (MTV) body armor and earlier Modular Lightweight Load Equipment (MOLLE) provide the best cases to synopsise the scope of NET practices for critical combat gear. These cases show a reasonable NET effort was undertaken, but they were ineffective in Marines understanding the full capabilities of these ICE.

1. MTV NET Case

a. MTV Requirement

Fighting in the Iraq War identified an urgent statement of need to improve the body armor with fielding to begin within 12 months. The simplified MTV requirements, listed below, illustrate the capabilities required to overcome combat deficiencies:

1. Increase armor plate coverage and protect against armor piercing bullets.
2. Modify the vest outershell to more comfortably support the inserted armor plates and the attached fighting tactical load weight to enhance mobility, and reduce fatigue and discomfort.

3. Provide a vest opening allowing for quick medical care with minimum movement of a wounded Marine.

b. NET Furnished for MTV Fielding

MTV NET was accomplished by three activities:

1. Plastic reference card issued with every vest that illustrated component assembly, levels of protection, and fit adjustment instructions.
2. Video instructions posted on Marine Corps Homepage, which is a website visited regularly by Marines.
3. NET team provided classroom hands-on instruction to “Train the Trainers” at every unit in pre-deployment training.

c. Outcome of MTV NET

Combat commanders recommended stopping MTV fielding after initial fielding due to user dissatisfaction. PM-ICE conducted a survey to isolate the problems. Mr. Fitzgerald/PM-ICE ('04 to '07) reports a telling statistic when “Only 3% surveyed were correctly fitted in the MTV they wore”³⁹ An improperly fitted vest results in instability when it is worn, which degrades mobility, range of motion, and target acquisition, increases fatigue, and creates uncomfortable pressure points. Adding these negative characteristics on top of the unavoidable heat strain imposed by body armor in hot climates over burdens combat Marines.

Why was NET ineffective for an item so important to the survivability of combat Marines? The answer likely lies in the Marines who received the hands-on “Train the Trainer” instruction. Mr. Fitzgerald indicates “Deploying units are so pressed for time that they find it difficult to spare resources to attend training. With unit leaders’ focus on higher pre-deployment priorities, he’ll satisfy the training directive by sending an available lower ranking Marine who is not capable of following through with the

³⁹ D. Fitzgerald. Interview by D. Townes, Telephone, July 29, 2008. PM-ICE Overview Briefing.

expectation that he will train the fellow Marines in his unit.”⁴⁰. We believe the low priority assigned to body armor training occurs because the units do not think this training is necessary or it has little to no value given their knowledge of the legacy item.

2. MOLLE NET Case

MOLLE reminds us of a similar problem approximately five years ago. In this case MOLLE NET was extensive with video instruction issued with every system, numerous article publications, and a two-man NET team traveling throughout the Corps to train Marines. MOLLE NET was remembered without prompting during School of Infantry and TECOM interviews. A SOI Combat Instructor indicated “my MOLLE video is in my garage after a couple of Permanent Change of Stations but I’ve never watched it”⁴¹ Saul Ruiz/Training Support at TECOM remembers the “The MOLLE NET team visiting TECOM to discuss training but I remember we didn’t think it was needed.”

This case shows that NET was successful in Marines noticing the available training, which is the first step to effectively communicate that training. However, the training message was not understood or persuasive. We attribute ineffective MOLLE messaging to three key factors. Training did not start at the right place. Training Marine tactical leaders first was overlooked but was necessary to convince them that their Marines and unit would be more combat effective by allowing them to tailor their load to their fighting position and personal preference. The level of MOLLE modularity did not exist in the legacy item and it would generate a lack of uniformity within the rank and file. Non-uniformity does not fit the military culture. Secondly, the training message did not persuade Marines that the modular system would reduce the fatigue from load carriage, which left Marines feeling the modularity was unnecessary and overly complicated.⁴² Finally, most Marines did not master the techniques needed to make use of MOLLE’s weight bearing improvements from its adjustable pack frame, waist belt,

⁴⁰ D. Fitzgerald. Interview by D. Townes, Telephone, July 29, 2008. PM-ICE Overview Briefing.

⁴¹ D. White, G. Camina, A. Abrams, B. Brooks, L. Lowe, B. Williams, and H. Alonzo, 2007, Interview by D. Townes, Tape recording, April 17, School of Infantry – East, Camp, North Carolina.

⁴² Ibid.

and weight distribution between hips and shoulders, or from jettisoning the pack with a single point release. Engaging the single point release was accomplished by movement technique, feel and no sight, which was too difficult for most Marines to master, and, as a result, required they rely on the buddy system to attach their pack frame to the belt. After approximately three years of fielding and improvement efforts, the negativity surrounding the MOLLE design could not be overcome. The PM-ICE made the decision to abandon MOLLE in favor of developing and fielding a new pack system.

3. Other ICE NET Efforts

We reviewed other ICE training efforts and found that NET material for less complicated items relies mostly on Marines reading written instructions. This passive training approach requires Marines to recognize a need for instructions, seek it out, and spend time understanding it, which is not the normal practice we found. Instead Marines gravitate to quicker learning to accomplish basic ICE utility by intuition, experience with a similar item, trial and error, or asking a fellow Marine advice. Finally, when all else fails, they will read instructions according to the TECOM and SOI interviews.

A variety of passive training methods are listed below in Table 3. The only consistent method practiced for every new ICE item is the permanent label and fielding message found in the first and last items listed.

Table 3. Passive ICE Training Approaches

- | |
|--|
| <ul style="list-style-type: none">- Use and care instruction labels permanently affixed to the inside of every item in an inconspicuous location.- Some use and care booklets provided in newly packaged items at the Central Issue Facility. The booklets are lost or discarded and not returned when the Marines turns in the item for re-issue.- Marine Corps Homepage includes a link to the PM-ICE where information on new ICE equipment is provided, including a picture, performance attributes, and commercial branding, such as Goretex TM, PolarFleece, Primaloft TM etc. The link is not well known by Marines.- Some articles are published in magazines and newspapers widely read by Marines. These articles generally identify the new ICE item, why it is being fielded, and its capabilities and benefits.- Equipment demonstrations and displays with fact sheet hand-outs at the annual Modern Day Marine Expositions (MDM) at each MEF. MDM is akin to a trade show where a wide variety of actual equipment is displayed that is used or proposed for future use.- Color illustrated instruction flyers packaged with each new item.- Technical Manuals for the unit supply element that describes the item, its parts, what repairs are authorized and how to make them, how to reorder complete items or replacement parts, and criteria that establishes when the item is unserviceable and ready for disposal.- Fielding messages that notify MEF Supply of a new ICE they will be provided. Messages include the purpose of the item, when Marines should expect it, the basis of issue, how to phase in new equipment if it replaces something older, and ordering information for unit repair and replacement. |
|--|

4. NET Preparation Analysis

No single or combined NET method appears to have resulted in Marines substantially understanding NET capabilities based upon the observations and trends reported in Chapter I and the two cases presented here. Our experience is that negativity develops within the unit that issued gear is inferior and unreliable because of incomplete understanding of ICE capabilities, e.g., a vicious circle. We expect more effective NET

would minimize these negative characteristics based upon proper ICE utilization to maximize the possibility of appropriate item use and thus improve Marines' performance, i.e., intervene in the cycle.

D. CURRENT ICE TRAINING PRACTICED

We visited two organizations to understand how ICE is trained and to better understand the factors explaining incomplete understanding of ICE Capabilities. The School of Infantry (SOI) trains new enlisted Marines in the fundamental Marine Common Combat Skills (MCCS) required to be an infantryman. The Central Issue Facility (CIF) is the central point within each of the Marine Expeditionary Forces (MEF) where experienced Marines acquire ICE. The findings from these two organizations were used to generalize about ICE training across the USMC since they represent typical conditions associated with through put for ICE training or issuing, experience levels, training methods and priority, and time constraints that exist in schools and the Operating Forces.

1. New Marine Entrants

We visited SOI- East in Camp Lejeune, North Carolina to inspect the ICE used in training, and to interview a panel of Combat Instructors (CI) to better understand how training is conducted and the constraints trainers face. SOI-East represents about 50% of the 38,000 new enlisted Marines. The findings are summarized below.⁴³

Representative ICE Training to New Entrants (ref-SOI Interview)

- **SOI Classes:** All SOI students are assigned to the Marine Combat Training (MCT) except for Marines with future infantry MOS, who are assigned to the Infantry Training Battalion (ITB). The annual MCT to ITB ratio is approximately 2.5 to 1, respectively.
- **MCT Class Characteristics:** MCT class sizes range from 200 to 410 students, lasting 28 days, with a 15 student (maximum) to 1 instructor ratio.

⁴³ D. White, G. Camina, A. Abrams, B. Brooks, L. Lowe, B. Williams, and H. Alonzo, 2007, Interview by D. Townes, Tape recording, April 17, School of Infantry – East, Camp, North Carolina.

- ITB Class Characteristics: ITB class sizes range for 200 to 280 students, lasting 54 days, with a 20 student (maximum) to 1 instructor ratio. The first 22 days of ITB accomplishes the same objectives as MCT and the remaining training period covers infantry MOS weapon platforms.
- ICE Issue: Each class obtains their suite of ICE from the SOI Central Issue Facility (CIF). Items are reviewed by CIs with students during the equipment serviceability check. The ICE used for training does not consist of all the ICE issued in the Operating Forces due to budget limitations.
- ICE Training: No formal classroom training or standards are used in either MCT or ITB ICE instruction. A few ICE items are trained if they are a supporting task, under the Mission Essential Task List (METL). Each METL teaches how to conduct a specific combat mission, and ICE training occurs if the equipment is needed to accomplish the mission. For example in a road march mission, load bearing equipment is trained to instruct the Marine what to pack, how best to pack it, and tightening and release features that they will operate during the mission.
- Method of ICE Training: The typical method of ICE training is a “school circle” approach where one CI will explain and demonstrate an ICE item to up to 100 Marines at a one time. The students are expected to imitate and practice what was demonstrated with the help of the circulating CIs inspecting and correcting student efforts. Students acquire rudimentary knowledge and learn ICE by trial by error, which improves from repeated experience with or without CI correction. Trial and error does not necessarily mean ICE use is correct or ICE capabilities are fully utilized.
- ICE Scheduled Training: No time is specifically scheduled for ICE training or correction. MCT fits in ICE remediation during the short periods of time the unit waits to do something else, such as waiting to enter the mess hall or receiving items from the armory. ITB has a limited amount of time built into their training schedule that they call “maintenance.” ITB CI use this time to address ICE that they deem necessary based on trouble they see occurring during training or to meet the needs of an upcoming training mission.

- CI Training to Train: The quality of ICE training is a function of the CI experience, preference, and bias. This quality issue is particularly significant for MCT where any MOS can become a CI. This training selection criteria limits the infantry experience to draw upon to train students. An ITB CI must be an infantry MOS, and it is assumed they are proficient with ICE capabilities.
- CI New ICE NET: CIs do not receive new equipment training. They are self taught by intuition, experience with similar items, and labels affixed to the inside of the item.
- CI Training Constraints: The most serious constraints facing the CI are the following: not enough time to train, outdated or incomplete equipment, and inadequate CI training to prepare instructors to teach students.

2. Operating Forces

The Operating Forces consist of experienced Marines who have completed minimum training in basic, infantry, and their Military Occupational Specialty (MOS). Furthermore, they have been assigned to one of the Marine Expeditionary Forces (MEF) for future deployments. The experience level for these Marines ranges from six months to over 20 years. Experienced Marines attend schools for advanced courses, which does not include ICE training, required for career progression.

The Operating Forces' first exposure to new equipment is at CIF where all ICE is issued. There is no new equipment training provided at CIFs. These experienced Marines are self taught by intuition, common sense, experience with a similar item, or asking a fellow Marine for advice. Some Marines may read the written instructions and seek other sources of ICE information that was previously mentioned.

3. Current Training Analysis

Except for a few instances, new entrants and experienced Marines essentially teach themselves on how to use ICE. As we indicated earlier, self training occurs from intuition, common sense, experience with a similar item, and fellow Marines advice.

These Marines also improve their ICE abilities and item performance by corrections through trial and error. From our interviews we conclude that when all else fails Marines will read the instructions.^{44 45}

For new entrants, there is little programmed ICE training time. When new entrants are assisted by CIs, the ICE inspection and correction received is contingent on CI's experience level, which may be limited. Furthermore, CIs instruction may be incorrect due to that limited experience.

New entrants training effectiveness is limited by outdated and unavailable ICE, and non standardized instruction. As a result, Marines understand basic ICE utility, but are not ICE proficient so as to increase their combat effectiveness for a deployment that is likely to occur within 12 months (Chapter IV, Table 13).

We find the training characteristics are not systematic, formalized or complete, which contribute to the Marines inability to understand the maximum capabilities of ICE.

Finally, training is constrained by time coupled with the USMC practices that deliberate ICE training is not needed.

⁴⁴ D. White, G. Camina, A. Abrams, B. Brooks, L. Lowe, B. Williams, and H. Alonzo, 2007, Interview by D. Townes, Tape recording, April 17, School of Infantry – East, Camp, North Carolina.

⁴⁵ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008, Interview by D. Townes, Tape recording, May 4, Training and Education Command, Quantico, VA.

IV. ABILITY OF AN AUDIENCE TO NOTICE INFORMATION: THE FIRST STEP IN COMMUNICATING INFORMATION TECHNOLOGY

The ability of an audience to notice information is the first step to effectively communicate.⁴⁶ Starting with this premise, this chapter analyzes the demographics of the Marine ICE user population and message timing as key factors determining if ICE users notice training information. The demographics of the USMC are analyzed to gain insight into their generational make-up to understand its influence on the kind of information noticed and the best ways to get them to notice information.

Message timing treats two factors that affect when to provide information to increase the Marine's probability of noticing it. First, we estimate how quickly ICE capabilities learned in training are likely to be used in military missions. Second, we examine when new ICE is available for training prior to deployment. Our assumption is that addressing generational differences within the Marine population means communicating in various mediums to reach all three generations, cognizant that the core fighting force are Millennials. Introducing the right equipment at the right time to support the "Train as You Fight" creed⁴⁷ will also result in a substantially higher probability of all Marines noticing and acting-upon ICE training and capabilities.

A. DEMOGRAPHIC

1. Operational Forces

The Marine Corps is comprised of a diverse group of men and women with a singular mission: to be trained, organized, and equipped for offensive amphibious

⁴⁶ J. Suchan 2007, "Media Choice Strategies: Import Terms" Lecture in Communication for Managers, MN3012, Naval Postgraduate School.

⁴⁷ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008, Interview by D. Townes, Tape recording, May 4, Training and Education Command, Quantico, VA.

employment, and as a “force in readiness.”⁴⁸ Within the four broad categories of the Marine Corps, there are Officers, Enlisted, Reserve Officers and Reserve Enlisted. In FY 2006, the Marine Corps had an operating force of 219,902 Marines. See Table 4.⁴⁹ See *Appendix C for FY2006 Officer Accession and Enlisted Grade Distribution.*

Table 4. FY 2006 Marine Corps Population Distribution

Age Range	Officers	Enlisted	Reserve Officers	Reserve Enlisted	Total
17-25	2,889	116,900	15	23,847	143,651
26-40	12,943	41,047	1,533	11,271	66,794
40+	3,193	3,445	1,717	1,102	9,457
Total	19,025	161,392	3,265	36,220	219,902

2. New Entrant Training

Each year, approximately 40,000 young men and women between the ages of 17 to 28 are either commissioned or enlist in the Marine Corps. In FY 2006 alone, 38,115 men and women enlisted in the Marine Corps active duty and reserves; 2,641 officers were commissioned, as summarized below in Table 5.

⁴⁸ United States Marine Corps Commands, Home Page, <http://www.usmc.mil> (accessed July 21, 2008).

⁴⁹ United States Marine Corps Commands, Marine Corps Concepts and Program 2007, Chapter 5, <http://hqinet001.hqmc.mil/p&r/Concepts/2007/TOC.htm> (accessed July 21, 2008).

Table 5. FY2006 Entrants

Enlisted				
SOI-East	MCT	Male	9,873	
	MCT	Female	2,254	
	ITB	Male	5,026	
SOI-West	MCT	Male	9,795	
	ITB	Male	11,167	
Total Enlisted				38,115
Officers	OCS	Male	2,433	
		Female	208	
Total Officers				2,641
Total Marines Entrants in FY 2006				40,756

In FY 2006 over 38,000 young men and women attended mandatory training at either the School of Infantry Camp Lejeune (SOI-East) or Camp Pendleton (SOI-West). (*see Table 5*) For either 59 or 29 days, all new enlisted entrants train to be able to serve in combat as riflemen, infantrymen, and infantry leaders in one of two Battalions: Infantry Training Battalion (ITB) or Marine Combat Training Battalion (MCT).

New officers to the Marine Corps are required to attend Officer Candidates School (OCS) and The Basic School (TBS) for ten weeks and twenty six weeks respectively. While attending both schools, newly commission officers receive intense classroom and field training.

During SOI, OCS and TBS, new entrants are taught skills needed to survive in combat in both classroom and field environments. This is the first time new entrants have the opportunity to notice ICE and its training information.

3. Experienced Marines

For the purpose of managing the Marine Corps population by groups, we labeled any Marine not attached to Recruitment Unit, SOI, OCS or TBS as an Experienced Marine. Due to new entrants and normal attrition, the experienced population will be considered the same as the Operating Forces.

The Marine demographics consist of both male and female, with males constituting more than 90% of the population in every category. See the gender distribution in Table 6.⁵⁰

Table 6. Gender Distribution

Gender Distribution				
		Number	Pecent	Total
Officers	Male	17,924	94.21%	19,025
	Female	1,101	5.79%	
Enlisted	Male	151,338	93.77%	161,392
	Female	10,054	6.23%	
Reserve Enlisted	Male	34,543	95.37%	36,220
	Female	1,677	4.63%	
Reserve Officer	Male	*	*	3,265
	Female	*	*	
				219,902

B. GENERAL ASSESSMENT

1. Operation Forces Generations

As indicated in the previous paragraph, the Marine Corps (FY 2006) was comprised of close to 220,000 members. Marines range in age from 17 to 60 years of age, with 65% between the ages of 17 and 25 (see Table 8). In general, age distribution can be grouped into 4 cohorts or generations: Veteran, Baby Boomer, Generation Xers or

⁵⁰ United States Marine Corps Commands, Marine Corps Concepts and Program 2007, Chapter 5, <http://hqinet001.hqmc.mil/p&r/Concepts/2007/TOC.htm> (accessed July 21, 2008).

Millennial, see Table 7.⁵¹ However, the Marines' age distribution can be categorized into three distinct cohorts or generations: Millennial, Generation Xer, and Baby Boomers, see Table 7.

Table 7. Four Generations

<u>Generation</u>	<u>Birth Years</u>
Veterans	1922 – 1943
Baby Boomer	1944 – 1960
Generation Xers	1960 – 1980
Millennial	1980 – 2000

Table 8. Total Number in Marines FY2006

	Age Range	Number	Percent
Millennial	17 - 25	143,651	65.33%
Gen X	26 - 40	66,794	30.37%
Boomer	40+	9,457	4.30%
	Total	219,902	100.00%

Most could agree that personality traits influence and comprise a generation's core values, motivation and training receptivity. Traits, language and attitude are socialized into each generation, influencing how that group tend to process and notice information. The following example illustrates differences in how these four generations gather information. On a Sunday after a young Marine returns home after SOI, the whole family decides to go the movies, but which movie to see? Everyone agrees to start looking for movie listings. Grandma, a member of the veteran generation, digs through the stack of newspaper looking for the entertainment section. Mom, a baby boomer, grabs the phone, a pencil and paper and dials the local Cineplex. The Marine, a Generation Xer, goes online and gets the local listings. And the cousin, a millennial,

⁵¹ R. Zemke, C. Raines, and B. Filipczak, 2000. *Generation at Work: Managing the Clash of Veterans, Boomer, Xers, and Nexters in Your Workplace*: American Management Association.

pulls out her combination personal digital assistants (PDA)-pager and punches the cinema icon.⁵² Each person obtains the same information, but the method of retrieval is different.

The Millennial generation is the Marines predominate generation with 65% of the population. The Millennial generation was born during a time when technology was all around them. In 2002, Interactive Digital Software Association researched the computer game-playing habits of U.S. residents' ages six and over. More than 50% played video.⁵³ Millennial will notice and process information quickly when presented in the form of video games or involves electronic connection or activity. Millennial have a "need for speed, connectivity, and activity."⁵⁴ The Millennial generation also responds to information scrolling on an electronic banner or in a manner that the Millennial has to interact with a Web page or some other form of technology.

2. Operational Forces Generational Training Analysis

All generations are most comfortable with learning approaches not too different from those used when they were young.⁵⁵ While most Marines have knowledge of legacy ICE or similar off-the-shelf commercial items, this knowledge is only a benefit if it makes a positive contribution to the training experience. Although generational differences may cause Marines to search for and process information in unique ways, uniform training information is needed for the unique attributes of new ICE that is released yearly.

The Marine Corps has a combination of three generations to notice and process key attributes of ICE. There are training tools that are beneficial to the majority of the

⁵² S. El-Shamy, 2004. *How to design and Deliver Training for the New and Emerging Generations*:Pfeiffer, 7-8.

⁵³ Ibid, 9.

⁵⁴ Ibid, 13.

⁵⁵ Ibid, 11.

Marine Corps population. While the Marine Corps has a structured training program,⁵⁶ there are adult generational training techniques that can benefit Operating Forces.

The discussion that follows provides examples of the three generational developmental learning approaches, which affects how the generations notice and process training material as adults. The two tables below (Table 9 and Table 10) integrate rank and age among the three generations and will be used with the examples.

Table 9. Officer Grade Distribution

Approx age range		
Rank	Lo	Hi
2ndLt	21	26
1stLt	23	28
Capt	25	35
Maj	30	40
LtCol	37	45
Col	40	48
Gen	50+	

</

Table 10. Enlisted Grade Distribution

Approx age range			
Rank	Lo	Hi	
Pvt	17	21	Millennial
PFC	18	21	
LCpl	19	22	
Cpl	20	22	
Sgt	21	24	Generation X
SSgt	27	30	
GySgt	30	34	
1stSgt/MSgt	34	38	Baby Boomer
SgtMaj/MGySgt	40-42	40+	

⁵⁶ United States Marine Corps Commands, Marine Corps Concepts and Program 2007, Chapter 2, <http://hqinet001.hqmc.mil/p&r/Concepts/2007/TOC.htm> (accessed July 21, 2008).

a. Baby Boomer

Baby Boomers are the smallest population in the Marine Corps comprising less than 5% of its members. They represent the following Marine ranks: all Generals, Field-grade Officers, Chief Warrant Officer 5, Chief Warrant Officer 4, Sergeant Major of the Marine Corps, Sergeant Major, and Master Gunnery Sergeant. Baby Boomers were taught primarily through “lectures and printed text.”⁵⁷ Baby “Boomers respond well to a variety of training formats. Their predilection for teams is accommodated by training seminars and workshops.”⁵⁸ Baby Boomers may prefer their training material to be scanned, so they can read the material at a glance.

b. Generation X

Generation X constitutes 30% of the Marine Corps population and their ranks are generally Lieutenant Colonels, Majors, Captains, Chief Warrant Officer 3, Chief Warrant Officer 2, Chief Warrant Officer 1 and First, Master, Gunnery and Staff Sergeants. Statistically, in *Generation at Work*, Zemke, Raines and Filipczak found that Generation X does not like to read as much as the Baby Boomers, but are comfortable learning from a computer.⁵⁹ Generation X tends to want to practice their skills and get feedback and coaching on the spot.⁶⁰ Generation X may respond well in a learning environment where they get involved in a task, make mistakes, and receive feedback.⁶¹

⁵⁷ S. El-Shamy, 2004. *How to design and Deliver Training for the New and Emerging Generations*: Pfeiffer, 11.

⁵⁸ R. Zemke, C. Raines, and B. Filipczak, 2000. *Generation at Work: Managing the Clash of Veterans, Boomer, Xers, and Nexters in Your Workplace*: American Management Association, 243.

⁵⁹ R. Zemke, C. Raines, and B. Filipczak, 2000. *Generation at Work: Managing the Clash of Veterans, Boomer, Xers, and Nexters in Your Workplace*: American Management Association, 243.

⁶⁰ Ibid, 244.

⁶¹ Department of Health and Human Service, 2002. *Strategies For Improving Miners’ Training: Getting Through to Greenhorns: Do Old Training Styles Work with New Miners?*, DHHS (NIOSH) Publication No. 2002-156, NIOSH-Publication Dissemination, 10.

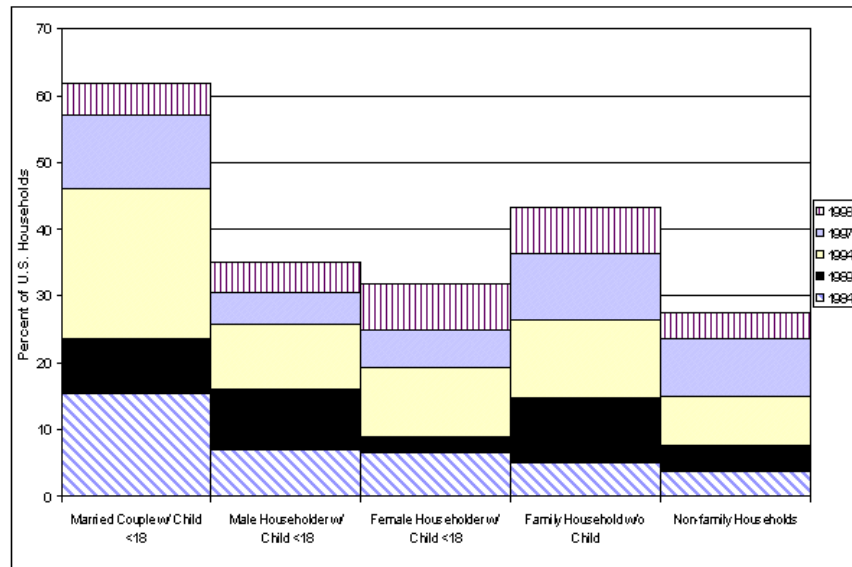
c. Millennial

The Millennials are the largest generation in the Marine Corps comprising 65 % of its members. Their ranks are generally officers from 2nd Lieutenant to Captain and enlisted Privates through Sergeant. This generation is the first to be born into homes that already had computers and cell phones. According to the U.S. Department of Commerce, the number of households with computer with children under the age of 18 has quadrupled, see Figure 2. Even though the data may appear somewhat dated, it appears valid for our study given a 23-year old Marine would have been born in 1985. The Millennial generation was weaned on video games, doing their term paper in full video, troubleshooting their computer at home, and even teaching their parents how to surf the Internet.⁶² This generation also “grew up with learning approaches that used teamwork and collaboration. They thrived in classrooms with learning pods and individualized options.”⁶³ The Millennial prefers fast-paced training that starts with something that catches their attention and an opportunity to apply what was learned.

⁶² R. Zemke, C. Raines, and B. Filipczak, 2000. *Generation at Work: Managing the Clash of Veterans, Boomer, Xers, and Nexters in Your Workplace*: American Management Association, 136.

⁶³ S. El-Shamy, 2004. *How to design and Deliver Training for the New and Emerging Generations*.:Pfeiffer, 11.

1984- 1998 (Selected Years)



Household Type	1984	1989	1994	1997	1998
Married Couple w/ Child <18	15.4	23.7	46.0	57.2	61.8
Male Householder w/ Child <18	6.9	16.1	25.8	30.5	35.0
Female Householder w/ Child <18	6.7	9.1	19.3	25.0	31.7
Family Household w/o Child	5.1	14.8	26.6	36.4	43.2
Non-family Households	3.7	7.6	15.0	23.5	27.5

Figure 2. Percent of U.S. Households with Computers by Household Type

d. Multi-Generational Tools

The Millennial and Generation X generations combined comprises 95% of the Marine Corps population. This equates to approximately 210,400 Marine under the age of 40. “*How to Design and Deliver Training for the New and Emerging Generations*” presents two methods designed to catch the attention of these two

generations without losing the small percentage of Baby Boomers. Both methods can be used in the classroom or the Consolidate Issue Facility (CIF), and are summarized below in Table 11 and 12.

Table 11. Multi-Generation Tool – Present Information Differently

Present Information Differently

- Have Basic Information Posted
- Have Key Concepts in View at All Times
- Present Information in Chunks
- Have Extra Information Available for Taking

Table 12. Multi-Generation Too – Using Multimedia

Four Ways to Add More Multimedia

- Show a movie clip that illustrates a key point that you are making
- Show pictures and various images that demonstrate your point or illustrate your subject matter.
- Show short segments of video games as examples of concepts
- Show digital pictures or video segments from real life.

3. Generational Analysis

As indicated earlier, the Marine Corps is comprised of three generations: Baby Boomer, Generation X and Millennial. Each generation has learning traits that tends to influence how the generation notices and processes information. Even though each generation processes information differently, there are a mix of tools with multiple generational appeal, including posted information, extra information available for the taking, video clip and electronic banners. ICE NET that incorporates these tools will encompass the majority of the Marine Corps in the Operating Forces and use of these tools can be beneficial to Marines noticing ICE at first exposure and during utilization.

We believe factoring in generational preferences is important when preparing new ICE NET to improve the Marine Corps population ability to notice and process training information for new entrants and Operating Forces.

C. COMBAT READINESS

1. USMC Readiness Status and Analysis

Table 13 below lists four USMC duty levels and the estimated time until Marines will be deployed. Table 13 also shows the percentage of the USMC population allocated at each duty level and where this study's two defined training groups fall. The purpose of this data is to understand the relevance of ICE training to deployment. The USMC population percentages and duty levels are estimated from typical unit rotational patterns.^{64 65 66} The numbers presented are generalized based upon normal tours of duty and do not reflect shifts that can occur due to response to emergencies, or alternate mixes of grades and MOS needed to fulfill operations.

⁶⁴ L. Wright, 2008. Interview by D. Townes, Telephone, September 4, Enlisted Affairs Analyst, Manpower and Reserves Affairs.

⁶⁵ Performance Indicators, Deployment History of Active Deputy Marines and Reserves. www.manpower.usmc.mil. (accessed September 4, 2008).

⁶⁶ D. Fitzgerald, Interview by D. Townes, Telephone, July 29, 2008. PM-ICE Overview Briefing.

Table 13. General USMC Population Distribution

	<u>Time Before Deployment</u>	<u>USMC Population</u>
<u>Forward Deployed</u>		
OIF/OEF	In Theatre	15%
MEU	In Area of Responsibility	4%
<u>Operating Forces</u>		
Pre-deployment	7 months	15%
MEU Work Up	6 months	4%
Post-Deployment	12 to 21 monthes	33%
<u>Supporting Estalishments</u>	12 to 36 months	15%
<u>Unassigned Marines</u>		
Training	12 months	12%
Transition, Patients, Prisioners	unknown	2%

From Table 13, we calculate that approximately 66% of the USMC are using or will use ICE capabilities during mission deployments within one to 12 months. The 66% is calculated from the sum of the forward deployed, pre-deployment and MEU work-up percentages listed, plus 50% of post deployment and training numbers, and 33% of the supporting establishment. The fractional portion of the identified groups corresponds to typical rotational pattern in normal tours of duty. This deployment cycle rate provides Marines a short time to develop new ICE knowledge and proficiency; therefore, noticing training information early will maximize their time to learn. As mentioned earlier, we know ICE will be used during deployments since new items are fielded to overcome previously identified battlefield deficiencies that impact operational effectiveness.

2. Pre-Deployment Training Plan and Analysis

Figure 3, Pre-Deployment Training Plan (PTP), illustrates the comprehensive training blocks to prepare Marines for combat.⁶⁷ The PTP is examined to determine where ICE NET supports combat readiness. There are four training blocks, where each successive block provides more advanced training as the Marine unit approaches

⁶⁷ "2006-2008. Pre-Deployment Training Plan, Training and Educations Command." 2008 Presentation.

deployment. Block I and II are individual skills accomplished at the home unit. Blocks III and IV represent collective training for a large combat scenario where units operate together simulating the mission they will support such as combat in Iraq (MV designation) or Afghanistan (MW designation).

Building Block PTP: 2006 - 2008

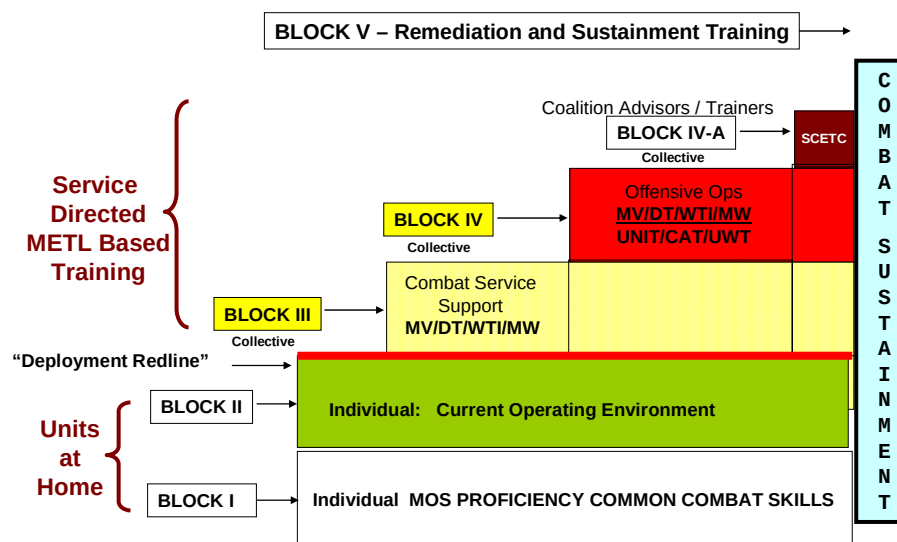


Figure 3. Pre-Deployment Plan (PTP)

We reviewed the skills required for each block and found no specific ICE training requirements. LtCol Dennison/TECOM MAGTF Training Branch Head indicated ICE proficiency is captured in Block I where unit commanders are responsible for their Marines competency in Marine Common Combat Skills (MCCS).⁶⁸ We can understand the classification of ICE as MCCS since the purpose of ICE is to extend the time Marines can fight effectively in combat. We have found no evidence that there is formalized ICE training practiced at the unit sustainment level. We believe this probably occurs since unit commanders fail to recognize Marines are not proficient in ICE and fail to realize ICE training’s value to improve performance in support of the mission..

⁶⁸ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008. Interview by D. Townes, Tape recording, May 4, Training and Education Command, Quantico, VA.

The PTP is periodically updated to reflect training needs based upon combat lessons learned. We reviewed the pending PTP revision and again found no specific ICE training. We will analyze two areas of training—combat stress as well as ethics and discrimination prevention-- that have been added and may be relevant to ICE.

Combat stress results most directly from Marines being wounded in battle, tending to fellow Marines casualties, and witnessing the destruction of war. We believe ICE may contribute to combat stress in two ways, which are less direct and catastrophic.

In the case of ballistic wounds, combat casualty data does not document whether the occurrence or severity of ballistic wounding is related to lack of protective coverage. However, from one of the author's direct experience in body armor development, she understands the direct relationship of overlapping armor coverage and the area of the body protected to casualty modeling results. Her experience revealed various practices reducing ballistic protection; improperly adjusted vests that do not accomplish the intended minimum ballistic overlaps, some protective components are not worn to reduce weight or increase comfort, or Marines choose to wear a smaller, less protective vest to reduce weight. We do not have casualty data to document wounding increases from these practices. However, we believe additional wounds could occur given our understanding on how coverage impacts casualty modeling and the previous MTV case that mentioned 97% of participating Marines had improperly fitted vests. Proper knowledge about armor use could minimize this added casualty potential and corresponding stress.

We believe quality of life can issues influence combat stress, particularly for lengthy or multiple deployments. ICE affects quality of life because it can mitigate or contribute to fatigue, discomfort, and minor injuries depending on understanding and usage. The negative effects from improperly used ICE are uncomfortable blisters, skin abrasions and aches, increased energy needed to carry unstable equipment, insufficient rest that occurs when sleeping gear is wet, and compounded difficulties when components are used together improperly or create physical interference and distraction. ICE proficiency could minimize these factors contributing to combat stress.

What we were surprised to see added to the Block I revision for PTP are blocks of instructions for politically sensitive issues. We found training added for two issues: ethics that addresses core values and sexual harassment and preventive measures for hazing and equal opportunity⁶⁹. These issues can be destructive as they can undermine unit cohesion and generate negative publicity. The inclusion of this type of training indicates that factors influencing combat effectiveness are diverse and interconnected. Consequently, as more USMC officer and enlisted leaders perceive ICE proficiency connected to combat efficiency, than a block of ICE instruction appears at least as important as ethics and discrimination.

D. CREEDS FOR NOTICING ICE TRAINING

While interviewing Marine military training experts,^{70 71} we noticed two credos that emerged as key contributors to Marines noticing NET information. The credos are mutually supportive where one espouses “training at first exposure” and the other “train as you fight.”

1. “Train at First Exposure”

a. *New Entrants*

During discussions about fundamental flaws in ICE training, LtCol Shultis/TECOM Current Operations Officer simply yet emphatically stated “Train Marines at their first exposure.”⁷² Further discussion identified three schools that offer the best opportunity for training at first exposure. The schools of interest and the Marines they train are listed below.

⁶⁹ “2006-2008 Pre-Deployment Training Plan, Training and Education Command,” 2008, Presentation.

⁷⁰ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008. Interview by D. Townes, Tape recording, May 4, Training and Education Command, Quantico, VA.

⁷¹ D. White, G. Camina, A. Abrams, B. Brooks, L. Lowe, B. Williams, and H. Alonzo, 2007. Interview by D. Townes, Tape recording, April 17, School of Infantry – East, Camp, North Carolina.

⁷² J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008. Interview by D. Townes, Tape recording, May 4, Training and Education Command, Quantico, VA.

School

School of Infantry (SOI)
Office Candidate School (OCS)
The Basic School (TBS)

New Marine Entrant

All enlisted Marines
Officer candidate basic training
All 2nd Lieutenants

b. Experienced Marines

When Marines are attached to a new unit, detach from a unit, or deploy, they must pass through the Central Issue Facility (CIF) to collect or turn-in equipment. On average, a Marine will pass through the CIF every three years. That is approximately 73,000 Marines utilizing the CIF every year.

In 2000, the Marine Corps Commandant directed centralized logistics management for Individual Combat Clothing and Equipment (ICCE) to the CIF. To avoid confusion, the earlier ICCE designation and ICE mean the same thing. The Commandant cancelled 782 career length gear issue and directed the property be transitioned to CIFs as the primary method of logistic support for ICCE. The CIF mission is “to provide centralized issue, recovery, and associated management of ICCE for operating force units and Marines assigned to bases, posts, and stations in a geographical region.”⁷³

The CIF is configured in a supermarket design that contains all the personal equipment for the Marines. Once Marines enter the CIF and shows their identification card, they receive a printout listing all the ICCE they will turn in or be issued. The CIF is a centralized location where all Marine can be exposed to and learn about all new ICE and the information associated with the item in one place.

⁷³ Marine Corps Order 4400.196, LPP-2. 2000. Centralized Logistic Management for Individual Combat Clothing and Equipment (ICCE) and Consolidated Issue Facilities (CIF), July 13.

2. “Train as You Fight”

a. *New Entrants*

ICE training improvements were addressed with a panel of Combat Instructors (CIs) at SOI – East. During these discussions, SSgt Abrams unequivocally stated; “You got to train as you fight!”⁷⁴ This belief was echoed by the TECOM experts.⁷⁵ This statement surfaced when the CIs indicated that the ICE used in training does not mirror the items used by the Operating Forces. Some items are not issued at SOI at all, and other items are earlier fielded versions.⁷⁶

A comparison of the different helmets used in training and current combat illustrates the disparity in equipment, which prevents the new entrant to “train as you fight.” The training helmet is the early 1980’s helmet. It has the same shell shape as the combat helmet, but it is equipped with a 2nd generation sling suspension that began to be phased out eight years ago. In contrast, the combat helmet uses a 4th generation pad suspension in a lighter weight ballistic shell. The surrogate training helmet satisfies the students need to learn how the helmet affects sound, sight, and spatial perceptions as well as conditions the body to support its weight. The difference in the suspension system is where students will be at a disadvantage in the Operating Forces and when deployed. Each suspension achieves helmet stability and comfort required to perform combat tasks differently. When the helmet is not stable, it moves on the head and the Marine will experience physical difficulties where the helmet hits or interferes with the back pack, protective eyewear, and weapon sight for target acquisition. Furthermore, an unstable helmet can even impair field of view. Movement from an unstable helmet also increases fatigue due to increased forces on the neck and causes skin abrasions from rubbing.

⁷⁴ D. White, G. Camina, A. Abrams, B. Brooks, L. Lowe, B. Williams, and H. Alonzo, 2007. Interview by D. Townes, Tape recording, April 17, School of Infantry – East, Camp, North Carolina.

⁷⁵ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008. Interview by D. Townes, Tape recording, May 4, Training and Education Command, Quantico, VA.

⁷⁶ A. Humes, 2008. Interview by D. Townes, April 17, 2008. Infantry Combat Equipment Inventory Inspections, Central Issue Facility at School of Infantry, Camp Geiger, NC.

Finally, the suspension adjustments affect the helmet's stand-off from the head which influences trauma injury when hit by a ballistic projectile. Developing skills to adjust the suspension is required to minimize performance degradation.

3. CREED Analysis

a. Analysis of Train at First Exposure

The new entrants are more likely to notice training communication because they are new to the organization. This newness results in their being at an impressionable stage of their professional development where new learning is their priority.

New entrants are made up solely of Millennials. We analyzed the new entrant training environment and Millennial information process preferences. Given limited classroom training, we do not find an opportunity to appeal to them in an electronic format that they prefer, but basic information on ICE should be posted in and around the training area where ever possible. The best opportunity to appeal to Millenials in this training environment may be to capture their attention in ICE introduction that is action-based, encouraging them to directly apply what they have learned. The current method of instruction best appeals to Generation X who also may prefer to practice their skill and receive coaching feedback. However, Generation X is no longer part of the new entrant training population.

Various messaging media formats are needed to enhance the ability of the Operating Force multi-generations to notice important characteristics of new ICE, which do not exist at the CIF today. An effective mix of formats that could be accommodated at the CIF are: posted signs with bottom line minimal information, video screens, and Standard Based Instruction (SBI) strategically placed near the new ICE. The Baby Boomer will likely read the posted sign and take the printed text to review later. Generation X will likely notice the sign with key points and the video banner.

Millennials will be drawn to video banner. By providing a mixed format with a redundant message, each generation of the Operating Force could notice information required to learn how to use the new ICE correctly.

b. Train as You Fight

The “train as you fight” creed applies largely to the new entrant population which solely comprised of Millennials. As mentioned in Chapter III, the schools rely on “school circle” training which appeals to Generation X given its emphasis on imitation, practice, and feedback. “School Circle” offers some compatibility with Millennials given their predilection to apply what they learned. To maximize the effectiveness of the “school circle,” the instructor must capture attention during the introduction, and stress individualized options.

The practice of issuing new entrants incomplete suite of ICE or older versions does not take advantage of their new learning opportunity. Two examples are provided to illustrate how training equipment can affect Marine performance and expectations.

1) The helmet is always worn by Marines during combat. Training the Marine with the combat helmet allows the Marine to learn how to adjust the helmet so that it remains stable during individual tactical movement techniques and does not degrade the tasks he/she will perform because of interference or distraction. The training environment allows students to learn how to use attachments and adjustments quickly without trouble and allows mistakes to be made without safety consequences. Finally, the training environment allows instructors to inspect and correct the Marine to ensure this life support item is being used correctly. As indicated earlier, new entrants learning the adjustments on the outdated training helmet will not apply when he/she is issued the combat helmet since it requires different adjustment knowledge and skills.

2) A simpler item also highlights the advantage of “train as you fight.” Any characteristic that improves quality of life in the field is critical. An example of this is illustrated by a comment the author heard in a focus group when one Marine stated with conviction “The most important thing is dry gear and sleep!” To support this need,

the Marine Corps is fielding a new waterproof bag to the Operating Forces to keep the contents of their back pack dry. When the new bag is properly closed, the back pack interior is waterproof when submerged during a river crossings or amphibious landings, or if the pack is exposed to extended days of rain. The operator to close the new bag properly requires about 10 seconds and meeting four standards: do not fill the bag beyond the maximum fill line, fold the top of the bag at a designated location, roll the fold down to the bag contents, and fasten the buckle at the end of the roll. Current training uses the Viet Nam era bag which is not waterproof, and is closed by twisting and tying the gathered top. To achieve waterproofing, Marines learn to line their pack with a trash bag, and sort and package their contents in zip lock bags to waterproof their gear.

We assume that when the new entrant receives the new waterproof bag in the Operating Forces, his/her expectation is the military issue bag is not waterproof based upon the typical training experience. Without more effective NET, it is not likely the Marine will notice the fold/roll instructions and fill line printed on the bag to achieve its waterproof performance. Consequently, the new bag will continue to meet the Marines expectation that it is not waterproof, they will continue using plastic bags for water protection, and be dissatisfied with the new military gear. No more than five minutes of training provided to Marines when first exposed to this item could eliminate unsatisfactory performance and wasted time retrofitting with plastic bags.

CIs consider the disparity between ICE training equipment and Operating Forces to be a factor in under utilized new ICE capabilities and user dissatisfaction. Maximum ICE capabilities are not realized since we miss the opportunity for Marines to notice the gear during a new learning opportunity. By missing this opportunity, new Marines assigned to the Operating Forces will rely on the practices of experienced Marines to quickly learn basic ICE utility. The quickest way to learn ICE includes common sense; intuition; or a fellow Marine's interpretation, preferences and biases.

When these methods fail, we are told they will read the directions.^{77 78} We believe these methods of learning do not result in the Marine having the complete knowledge to take advantage of ICE capabilities.

E. FIELDING STRATEGY FOR NEW ICE

PM-ICE fields new ICE according to the priorities dictated by Headquarters, Marine Corps Planning, Programs, and Operations (PP&O). Representative fielding priorities were obtained from PM-ICE office to understand how new items are fielded to the Operating Forces and training community.

1. Representative Fielding Plans and Implementation

Table 14 lists the fielding priorities for three different ICE items across the ICE spectrum. The listed units are fielded in descending order.^{79 80 81} To simplify the data, each unit is an aggregate of several sub-units.⁸² ICE Inventory is fielded concurrently to each of the three MEFs to establish an Initial Operating Capability (IOC) until Full Operational Capability (FOC) is complete.

⁷⁷ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008. Interview by D. Townes, Tape recording, May 4, Training and Education Command, Quantico, VA.

⁷⁸ D. White, G. Camina, A. Abrams, B. Brooks, L. Lowe, B. Williams, and H. Alonzo, 2007. Interview by D. Townes, Tape recording, April 17, School of Infantry – East, Camp, North Carolina.

⁷⁹ R. Lomba, 2006, *Single Acquisition Management Plan for Combat Desert Jacket: Report*, July 18, 2006. MARCORSYCOM PM-ICE Project Files.

⁸⁰ L. Lara, 2007. *Fielding Plan for Modular Tactical Vest: Report*, February 20, 2007. MSID/GENADMIN/CG MARCORSYCOM CESS.

⁸¹ I. Bello, 2007. *Fielding Plan for Improved Load Bearing Equipment Waterproof Bags*, September 21, 2007.

⁸² L. Lara, 2008. Interview by D. Townes, August 5, PM-Infantry Combat Equipment, Individual Armor and Load Bearing.

Table 14. Sample of ICE Fielding Plans with Units in Descending Priority.

MTV		Combat Desert Jacket		Improved Load Bearing Equipment	
<u>Unit</u>	<u>Quantity</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit</u>	<u>Quantity</u>
III MEF	6,900	II MEF	46,340	I MEF	44,580
II MEF	32,375	I MEF	44,857	II MEF	53,241
I MEF	20,475	III MEF	24,648	III MEF	23,622
MARCENT	250	RESERVE FORCES	42,960	RESERVE FORCES	41,445
TECOM:		TECOM:		TECOM:	
Schools of Interest	0	Schools of Interest	27,419	Schools of Interest	21,937
Other Schools		Other Schools	4,532	Other Schools	0
INSTALLATIONS	0	INSTALLATIONS	7,144	INSTALLATIONS	5,799
Total AO	60,000		197,900		190,624

2. Fielding Plan Analysis

The three MEFs represent 75% to 100% of the PM's Acquisition Objective (AO) to satisfy FOC inventory levels, and require most of the fielding period to complete. The rationale behind equipping the MEFs first is to ensure the Operating Forces have the equipment needed for deployment and pre-deployment training. This fielding strategy finds the training schools do not receive the ICE training equipment until two to three years after new ICE introduction at the MEFs, if at all.

The training inventory level required at the schools equals 12 to 15% of the total AO. When we reviewed typical PM-ICE production delivery schedules, we find the school training quantity is generally met with one to two months of production out of the 24 to 36 months total production time. The percentage of production and fielding time to equip these schools is relatively small when compared to the total AO. As we indicated, earlier receipt of training ICE is more effective as it supports the creeds to "train at their first exposure" and allow Marines "to train as they fight." This training outcome will result in new Marines arriving at the Operating Forces better trained and prepared for their future deployment within approximately 12 months. A second benefit is these Marines can act as embedded trainers within their unit and provide reliable instructions on maximum capabilities of ICE.

The MTV case supports the value of properly trained Marines within the units. When Table 14 is reviewed, we find no MTV are fielded to the schools of interest for training. The MTV schedule and fielding priorities dictated equipping forward deployed Marines in Iraq as fast as possible based upon its urgent statement of need.⁸³ As previously mentioned, MTV NET employed a train the trainer approach, which was ineffective because of units' conflicting pre-deployment priorities and limited resources to spare for or interest in body armor training.⁸⁴

We believe that a diversion of a small training quantity of MTV to SOI and TBS might take advantage of new learning at first exposure to more effectively train new combat Marines. School training of MTV could have augmented the "train the trainer" approach where new Marines would understand how to use MTV properly and be able to help train others needing instruction in the unit.

We strongly believe a one to two month delay in initiating fielding to the MEFs is needed to allow deliveries of a relatively small quantity of ICE to selected schools first. This fielding shift might provide the equipment needed to "to train at first exposure" and "train as you fight" for more effective training. The improved training is designed to produce better prepared Marines assigned to the Operating Forces. If initial fielding to the selected schools is rejected by PP&O, then we hope they would consider an alternative, as an interim short- term fielding interruption to the MEF. If this alternative is chosen, we recommend one to two month delivery interruption at the MEFs after a minimum initial operational capability (IOC) is in place to support critical mission needs.

The one to two month inventory delay to the MEFs may favor the Operating Forces in the long run in two ways. First, the Operating Forces would be augmented with new Marines with improved combat readiness. An improved level of readiness would mitigate unit commander training pressures, thereby shifting time where it is needed, e.g., not re-learning how to use basic gear. Secondly, properly trained new Marines can act as embedded trainers with the requisite knowledge and abilities concerning new ICE

⁸³ L. Lara, 2008. Interview by D. Townes, August 5, PM-Infantry Combat Equipment, Individual Armor and Load Bearing.

⁸⁴ D. Fitzgerald. Interview by D. Townes. Telephone. July 29, 2008. PM-ICE Overview Briefing.

capabilities. Embedded trainers are compatible with the Marine culture to ask a fellow Marine for advice and demonstration. New Marine embedded trainers may respond positively to this role given the generational preference for team work and collaboration. Consequently, experienced Marines can learn quickly from new Marines, i.e., reverse engineering.

F. SUMMARY

New marines may best develop knowledge and skills on maximum ICE capabilities during initial infantry training since it presents the best opportunity to notice training information and to learn. Redundant messaging in different formats is needed to be noticed by the multi- generational Marine Corps composition. Generation X and Millenials, who make up 30% and 65% of the Marine Corps, respectively, can become the focal point when ICE NET is revised. Training that incorporates posted signs around the training area, and movie clips or videos might better capture the attention of the growing Millennial population within the Marines. Incorporating electronic connectivity and activity could be pursued wherever possible to appeal to and capture the attention of the Millennial fighting core.

Contributors fostering this new learning opportunity are grounded through the traditions of military training expert credos: “train at first exposure” and “train as you fight.” To implement this training, new Marines are instructed on the same gear they will be issued in the Operating Forces. This change will necessitate improvements in ICE training inventories and disposition priorities. Currently, new ICE fielding priorities find the schools receiving items up to three years after the Operating Forces. To rectify this disconnect, an adjustment in the ICE fielding priorities is needed where the relatively small school ICE allocation is fielded much earlier to enable Marines to develop proficiency on the items they will be soon using in the Operating Forces.

Undertaking practical changes to increase Marines ability to notice important information can be designed to lead them to the next steps of retaining, applying and teaching ICE capabilities, all of which leads to creating a beneficial cycle. These practical changes include incorporating messaging formats that appeal to different generations, insuring the message is available at Marines first exposure to new ICE, and training new entrants as they will fight in Operating Forces.

V. TRAINING INSTRUCTIONS CRUCIAL FOR UNDERSTANDING ICE CAPABILITIES

Once Marines notice ICE training information, the instructions must be presented to enable them to quickly understand the item's added capabilities beyond its basic utility. Learning strategies were investigated to determine how different attributes (mandatory attendance versus voluntary attendance, inexperienced learner versus experienced learners, learners being subordinate to the teacher versus learners equal to the teacher) affect learning in our two training groups: new entrants and experienced Marines. Next we describe a standard based instruction (SBI) training approach. The SBI approach is simple and efficient with broad use throughout the USMC. SBI satisfies the Marines training culture, various user training needs, and lends itself to delivering the message in various media to accommodate different training environments and generational preferences to increase understanding. We believe a consistent SBI message would address different training group's learning attributes and could be presented in a manner best understood by Marines without conflicting interpretations.⁸⁵

A. LEARNING STRATEGIES

1. Pedagogy and Andragogy Learning Principles and Analysis

As indicated in Chapter I, new infantry combat equipment (ICE) is fielded to the USMC to provide required capabilities to enhance Marines performance, survivability, and mobility during operational missions. New Equipment Training (NET) is required to train Marines on how to use the specific capabilities of a new item provided to them. In order to ensure that Marines understand the message that is presented, we investigated learning strategies that maximize understanding and retention of the training information presented.

⁸⁵ J. Suchan 2007. "Media Choice Strategies: Important Terms" Lecture in Communication for Manager/MN 3012, Naval Postgraduate School.

In 1960, Malcolm Knowles first introduced “andragogy” as a system of ideas, concepts, and approaches to adult learning in the United States.⁸⁶ Pedagogy, the art and science of teaching children, was the primary teaching strategy used until the 20th century. Pedga, meaning child, “originated with early monks who recorded common characteristics among children who were learning basic facts.”⁸⁷ Instructors realized children and adult learners had different learning characteristics in the middle of the 20th century. It was not until Knowles introduced the term “andragogy” that the United States started developing different learning models for adults and children.⁸⁸ We evaluated these perspectives against our two Marine training groups: new entrants and experienced Marines. Our two training groups provide distinct differences between their level of maturity, experience and desire to obtain information. We believe these differences affect how they learn information and should be addressed in formulating improvements to ICE NET.

Pedagogy and andragogy can be described as the combination of a multi-dimensional set of variables including locus of control, learner characteristics, and situational circumstances.⁸⁹ Table 15, lists pedagogy and andragogy characteristic attributes that may be predominate in an age group but not necessarily determined by the age group. We reviewed these learning attributes to determine how they apply to our two training groups. We added two columns to the table and assigned attributes that applied to new entrants and experienced Marines.

Current Marine Corps training implicitly uses two types of teaching strategies: pedagogy and andragogy. New entrants attending mandatory training in a school setting, i.e., SOI, OCS or TBS have the characteristics of pedagogy learners, while experienced Marines are largely self-taught reflecting andragogy characteristics. Therefore, we see

⁸⁶ R. Hiemstra and B. Sisco, 1990. *Moving from Pedagogy to Andragogy*, Adapted and Updated from *Individualizing Instruction*, <http://www-distance.svr.edu.html> (accessed September 13, 2008).

⁸⁷ K. Thoms, n.d. *They're Not Just Big Kids: Motivating Adult Learners*. <http://frank.mtsu.edu/~itconf/processd01/22.html>. (accessed September 12, 2008).

⁸⁸ Ibid.

⁸⁹ Adult vs Child Learning, n.d. <http://internet.cybermesa.com/~bjackson/Papers/Androgogy.htm>. (accessed September 9, 2008).

that new entrants met all the attributes for pedagogy, child learner, while experienced Marines met all the characteristics of adult learners. See Appendix D for additional information on the definition of the listed attributes in Table 15.

Table 15. Pedagogy and Androgogy Attributes

Pedagogy	New Entrant	Androgogy	Experienced Marines
Mandatory Attendance	X	Voluntary Attendance	X
Subject Centered	X	Problem Centered	X
Dependant Learners	X	Independent Learners	X
Inexperienced Learner	X	Experienced Learners	X
Teacher Prescribed Content	X	Learner Prescribed Content	X
Learners Grouped by Age Level or Ability	X	Learners Grouped by Interest of Needs	X
Learning for the Future	X	Learning for the Now	X
Learners Subordinated to the Teacher	X	Learners Equal to the Teacher	X
Rigid, Traditional Structure	X	Flexible, Alternative Structure	X

2. All Marines (New and Experienced)

As adult learners, the four elements⁹⁰ listed below must be addressed to ensure that Marines learn and understand the information presented. We next describe how each element affects learning and how it applies to Marines.

- a. Motivation
- b. Reinforcement
- c. Retention
- d. Transference

a. Motivation Learning Element

In the Australian Government “Adult Education Guide,” it states:

Adults learn most effectively when they have an inner motivation to develop a new skill or gain new knowledge. They resist learning material

⁹⁰ S. Lieb, 1991. *Principles of Adult Learning*, Best Practice Resources, <http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/adults-2.htm> (accessed September 9, 2008).

if it is forced on them, or if the only reason given is that the material will, in some vague way, be ‘good for them to know.’ Adults need to know why they are being asked to learn something; and they definitely will want to know what the benefits will be before they begin learning.⁹¹

One best motivator for Marines to learn the unique characteristics of new ICE is to identify the explicit benefits of the equipment and how it can satisfy their basic needs. Maslow’s “Hierarchy of Needs” suggests people are motivated to fulfill basic lower-order (extrinsic) needs before moving into higher-order (intrinsic) needs, e.g., lower levels of the pyramid are the most basic needs and higher levels are more complex and personal, see Figure 4.⁹² The bottom tier on Maslow’s hierarchy is physiological referring to basic life needs such as air, food, shelter, sleep and warmth. The next tier on the triangle is safety, e.g., security of body, health, employment and resources. Maslow’s theory suggests that the ICE training messages must communicate that the equipment will enhance Marines’ safety or physiological needs. We believe Marines will be motivated to learn the capabilities and understand its importance by associating ICE NET with their basic hierarchy of needs. In the improved SBI in Figure 6, “increase ballistic protection and survivability in combat” was added to the SBI to clearly indicate how this ICE will improve Marine safety.

⁹¹ Australia, Financial Literacy Foundation, 2006. *Adult Education Guide – Principles of Adult Learning*, Australian Government, <http://www.understandingmoney.gov.au/documents/AdultEducationGuidePrinciples.pdf> (accessed September 10, 2008).

⁹² Maslow’s Hierarchy of Need [Image], http://en.wikipedia.org/wiki/Image:Maslow%27s_hierarchy_of_needs.svg#file. (accessed September 9, 2008).

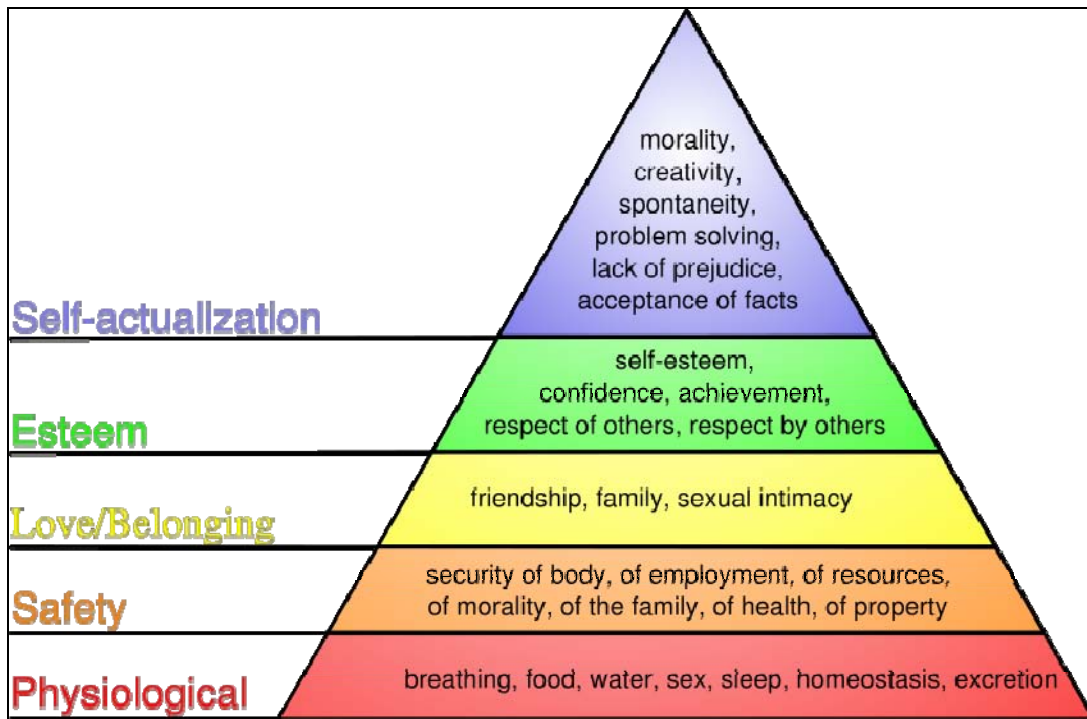


Figure 4. Maslow's Hierarchy of Need

b. Reinforcement Learning Element

In Principles of Adult Learning, Stephen Lieb stated “Reinforcement is a very necessary part of teaching/learning process; through it, instructors encourage correct modes of behavior and performance.” Unit leaders are able to notice a Marine’s proper and improper use of ICE and provide immediate feedback. Their feedback in a functional environment is necessary to reinforce good behavior and change bad behavior. The reinforcement received will enhance the Marine’s ability to learn and understand ICE capabilities. For example, during “school circle” training, CI can inspect and correct new entrant while he/she imitates and practices what was understood from the explanation and demonstration. For the experienced Marine, written instructions need to address how to use new ICE correctly.

Reinforcement can be seen in the helmet SBI provided later in this chapter (Figure 6). The task, condition and standards portion of the SBI teaches the Marine to make three adjustments for the Marine to fit the helmet to himself/herself to achieve the

stability and comfort needed for continuous wear. The troubleshooting information lists the outcome of improper use and how to correct it, such as instructing the Marine to check four helmet areas when he/she experiences instability.

c. *Retention Learning Element*

Marines must retain information on new ICE in order to benefit from the item. In order for the Marine to retain the unique characteristic of new ICE, Marines “must see a meaning or purpose for that information. They must also understand and be able to interpret and apply the information. This understanding includes their ability to assign the correct degree of importance to the material.”⁹³ When Marines notice the unique characteristics of the equipment and relate its unique function to the basic needs of survival, they will retain the information and apply it on the battlefield. The retention learning element can also be found in the helmet SBI provided at the end of this chapter (Figure 7). The task of wearing the helmet clearly articulates the purpose of the training to “properly wear the combat helmet to increase ballistic protection and survivability in combat.” The standards, immediately following the task and conditions, focus on three important adjustments with illustrations to help the Marine locate, understand, apply, and retain the instructions provided.

d. *Transference Learning Element*

Marines must be able to take basic information learned and maximize the characteristic of ICE in training and on the battlefield to enhance their performance, survivability and mobility in different environments. The modular sleep system example helps explain transference. A modular sleep system consists of four separate components: bivy cover, sleeping bag, waterproof compression stuff sack, and sleeping mat. The complete system weighs 5.8 lbs and will protect the Marine from a combination of temperatures ranging from 0° and 120° Fahrenheit and any weather condition(s) of rain, wind or sandstorm.

⁹³ S. Lieb, 1991. *Principles of Adult Learning*, Best Practice Resources, <http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/adults-2.htm>. (accessed September 9, 2008).

Effective training must teach the Marine the purpose and performance of each item. Equally important, the Marine must learn to select a combination of the fewest number of components for adequate protection from anticipated environmental conditions. The right combination of components will reduce weight and volume that decreases mobility and increases fatigue over an extended mission duration. We expect a Marine will chose to carry the complete system at 5.8 lbs only in temperatures consistently below 45° Fahrenheit for missions longer than two days. At 60° Fahrenheit the Marine is likely to carry only half the weight of the system by using only the bivy cover and mat with personal clothing and poncho liner. Finally, in warm dry conditions, the Marine may bring only the sleeping mat, which is a fraction of the system weight at 1.2 lbs. Training will be effective when the Marine retains and transfers the sleep system components by selecting the minimum number of components to correspond with varying mission requirements, duration, and conditions.

3. Learning Strategy Analysis

a. New Entrants

Entry level of training at our schools of interest -- SOI, TBS, and OCS -- is a very structured training cycle. At each school, each new entrant receives the same tactical training, for the same duration, and the same knowledge and skills required to perform as a Marine. The method in which TECOM instructs all new entrants to develop Marine skills is pedagogy. New entrants meet all the pedagogy attributes as indicated in Table 15. The Marine Corps instructors have “full responsibility for making decisions about what will be learned, how it will be learned, when it will be learned, and if the material has been learned.”⁹⁴ The current training strategy is better suited for Baby Boomers, and is not ideal for Millennial generation entering the Marine Corps. As stated in Chapter IV, the Millennial generation prefers a fast, self- paced training, electronic media, and individual training options.

⁹⁴ R. Hiemstra and B. Sisco, 1990. *Moving from Pedagogy to Andragogy*, Adapted and Updated from *Individualizing Instruction*, <http://www-distance.svr.edu.html> (accessed September 13, 2008).

b. All Marines

Although ICE NET is provided to the Operating Forces, in most circumstances it is overlooked or ignored. We believe the best ways to motivate Marines to understand the unique capabilities of ICE are to associate the NET with Maslow's Hierarchy of Needs and the appropriate learning strategy. We believe the Operating Forces will both notice and understand the NET presented by combining terminology associated with the Operating Forces' biological, physiological and safety needs with the media recommendations made in Chapter IV, i.e., posted information, extra information available for the taking, video clips and electronic banners.

Generation X is comfortable with electronic technology and prefers to scan reading material for key or important information. Their preference for brief messages will allow them to notice the headlines, graphic or bullets on posted information provided. The Millennial generation grew up in an environment where technology was all around them, i.e., home, school and play. Because of their technology interest, the Millennial generation is more likely to notice video clips and electronic banners. Generation X may not be as technologically savvy as Millennials, but they are comfortable with technology making electronic banners a likely good fit within their comfort technology range.

Also, everyday is a training opportunity where "learning for the now" is beneficial and an andragogy attribute. Marines experience "unplanned on-the-job-training (OJT)" daily. This training is not written or timed, but when the training is provided from a knowledgeable Marine, the training is invaluable: "Learning by experience is important in that adults learn best by having experience and reflecting on them."⁹⁵ Unplanned OTJ can be particularly effective for reinforcement, retention and transference elements for all Marines.

⁹⁵ Department of Health and Human Service, 2002. *Strategies For Improving Miners' Training: Principles of Adult Learning: Application for Mine Trainers*, DHHS (NIOSH) Publication No. 2002-156, NIOSH-Publication Dissemination, 3.

The following provides a brief description of the learning elements - motivation, reinforcement, retention, transference - that are applied to ICE NET for a helmet and how it could be integrated to enhance the Marine to understand the training information.

Motivation - When distributing training information on the combat helmet, Marines should be informed promptly about the benefits of wearing the helmet correctly and the key points of proper helmet use in a simple, crisp manner. An example of how the key points for the helmet could be present by a CI or unit leader is as follows - Marine must know to make three adjustments to fit the helmet to their head, to be sure it is stable so it does not degrade individual movement techniques, and be comfortable for continuous wear:

- 1) internal headband
- 2) chin strap
- 3) chin strap buckle

With the basic helmet adjustments provided, the andragogy experienced Marine will independently undertake trial and error and seek information on the helmet if more information is still needed. Also, concise examples about serious injuries that occurred by improper usage of the helmet or injuries that were minimized by the proper wearing of the helmet should also be provided in a narrative format from the CI or unit leader. These examples will appeal to the Marine's need for safety and provide concise points and concrete examples that make the information stick.⁹⁶

Reinforcement - For the Operating Forces, there is no new equipment training at the CIF where the Operating Forces are first exposed to new ICE. Therefore, formal reinforcement is difficult, but not impossible. The Operating Forces can receive reinforcement of the training information by presenting the same information in various formats. As stated in Chapter IV, information can be presented in the CIF with posted signs, video screens, and SBI placed near the new ICE, all with the same concrete

⁹⁶ C. Heath and D. Heath, 2007. *Made to Stick: Why Some Ideas Survive and Other Die*, United States: Random House.

information. The repetition of information will reinforce the equipment's proper use and the material importance. Unit leaders and CI can also administer reinforcement during unplanned OJT. A unit leader can correct the actions of a Marine or provide reinforcement during training.

Retention – During training exercises, unit leaders or CI can randomly ask a Marine in their units the 3 adjustment points of the helmet. He/she could also ask a fellow Marine to explain why the Marine is experiencing a problem and to recommend corrective action.

Transference – A Marine, promoted to Corporal Fire Team Leader, leading his team of 3 riflemen sees a Marine having helmet interference when firing his weapon in the prone position. He inspects the Marine's helmet and realizes the neck strap is not properly tightened. He uses his knowledge to inspect and correct the Marine to lead and reinforce transference.

B. STANDARDS BASED INSTRUCTION (SBI)

When we discussed ICE training shortcomings with TECOM experts, LtCol Hartshorne/ Ground Combat Section Head stated "Effective Marine training comes down to standards based instruction (SBI) where an ICE task, condition, and standards need to be clearly specified."⁹⁷ Task identifies what the Marine is required to do, condition describes the state of use while performing the task, and standards specify the criterion for proper use. The SBI approach is used extensively in Marine military training. LtCol Hartshorne provided an SBI example, summarized below, of the combat helmet with sling suspension. The current SBI is a good foundation for the Marine Corps, but we will show how the SBI can be improved to motivate and appeal to newer generational preferences.

⁹⁷ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008. Interview by D. Townes, Tape recording, May 4, Training and Education Command, Quantico, VA.

The current SBI format provides the minimum information to instruct the Marine how to properly wear a helmet, but the format does not appeal to the Millennial generation or the Operating Forces adult learners' hierarchy of needs. The information presented in SBI must be simple, clear and credible in a format that will catch the Marines' attention. The Marine must notice the information on the SBI and the key information must stick.

LtCol Hartshorne also emphasized that ICE instruction needs to be concise so that "in about 60 seconds you can tell a Marine what is not intuitively obvious."⁹⁸ To convey unintuitive information in 60 seconds, Chip Heath and Dan Heath's principles of stickiness must be incorporated to maximize the impact of the message and be retained by the Marine. The message must be simple and profound, clear, and credible while being presented in a story format.⁹⁹ By incorporating Heath's principles of stickiness, the Marine will be motivated to retain the information presented.

⁹⁸ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008. Interview by D. Townes, Tape recording, May 4, Training and Education Command, Quantico, VA.

⁹⁹ C. Heath and D. Heath, 2007. *Made to Stick: Why Some Ideas Survive and Other Die*, United States: Random House.

TASK:	Properly wear the combat helmet.
CONDITION:	Continuous wear for ballistic protection.
STANDARDS:	A. Helmet stability is achieved with <u>3 adjustments</u>: 1. Adjust the internal headband to fit snug 2. Position the side chin strap to rest below the ears and the chin cup fits snugly around the chin when fastened. 3. If needed, reposition chin strap buckle to the cheek opposite the weapon firing position. B. Position the helmet brim level with eyebrows. C. Tighten the chin and neck pad straps so the helmet stays level and does not move when your head is jerked side to side, up and down, nor tips forward in the prone firing position.

Figure 5. Example of SBI

1. SBI Analysis

When we reviewed ICE developments, we found most of the information needed for an SBI can be extracted from lengthy detailed technical information, but the training message was not presented in a simple, concise format. We believe a lack of simple and explicit standards helps explain why full ICE capabilities are not noticed, understood and retained by Marines. As mentioned previously in Chapter IV, the general attitude we found in the USMC is that ICE does not require training since it is easy enough for Marines to learn by intuition, common sense, experience with a similar item, and trial and error. This attitude and these learning practices do not motivate Marines to seek ICE training information. We believe this behavior is compounded by dwindling Baby

Boomers and increasing Millennials throughout the USMC population. The Baby Boomer is satisfied with scanning written information found in training instructions if sought. On the other hand, Millennials have a preference to use technology to enhance their learning experience. Their “need for speed” and disinclination to read traditional text explains why they gravitate to the fast paced approaches with immediate feedback from trial and error, rather than spend time seeking and interpreting written instructions. Millennial do not spend time seeking written instructions and likely prefer the interactive training dynamic with CIs when they inspect and correct students during the “school circle” training cycle. These approaches give the Millennials the immediate feedback they prefer to reading and interpreting instructions.

We believe the SBI format is suitable for the learning style strategies presented in our two training environments and the learning attributes associated with them as listed in Table 15. The SBI specificity supports the school setting for the pedagogy attributes of being subject centered, prescribing teacher content, providing knowledge students will use in the future, and being compatible with the rigid, traditional structure of the teacher and student environment. However, SBI is also applicable to the andragogy attributes we find in our experienced Marines.

From the experienced Marine’s perspective, the same information can be found centered on satisfying a near term need in upcoming training and deployment. The experienced Marine is an independent learner who voluntarily tends to his/her training when needed. Andragogy attributes find the adult learner is an experienced learner who is problem centered, who focuses on learning for now and grouped by interest or needs. These attributes naturally align with the Marine learning needs in pre-deployment training and deployment preparations as they contemplate the mission requirements and performance expectation of themselves and their unit. Given these characteristics, he/she will need to obtain training information to address the problem they have identified. We expect our recommended use of different media for experienced Marines and consistent, concise SBI format will increase the Marines’ ability to notice, process, understand and retain training that is compatible with their voluntary learning needs.

The SBI example can be further enhanced to appeal to the newer generations' visual preference and adult motivation and retention learning elements. The revised SBI, shown below, includes illustrations to visually stimulate the dominate generations, and simple selective wording in bold text to address motivation and retention learning elements for adult learners. Adding these cues does not reduce the message's brevity and is expected to enhance Marines' understanding and retention of training information. Preparation of more effective illustrations was beyond the scope of this study. However, we recommend that when SBI is adopted in ICE NET practice, SBI preparation should emphasize maximizing visual illustrations where ever possible to replace words to increase its appeal to 95% of today's Marine Corps population.

TASK:	Properly wear the combat helmet to increase ballistic protection and survivability in combat.
CONDITION:	Continuous wear for ballistic protection without interference and increased comfort.
STANDARDS:	A. Helmet stability and fit is achieved with <u>3 adjustments:</u> 1. Adjust the internal headband to fit snug but comfortably round the head. 2. Position the side chin strap to rest below the ears and the chin cup fits snugly around the chin when fastened. 3. If needed, reposition the chin strap buckle to the cheek opposite the weapon firing position to avoid interference. B. Position the helmet brim level with the eyebrows for proper ballistic head protection. C. Tighten chin and neck pad straps so the helmet stays level and stable where it does <u>not</u> tip forward in prone firing position, and does not moves when your head is jerked side to side, up and down which increases fatigue. D. Clean off dirt and sweat with brush and soapy water to prevent a rough surface rubbing against your skin. Rinse completely and air dry.

Inside View



Figure 6. Helmet SBI Improved with Illustration and Selective Wording

We previously mentioned that the brevity of SBI lends itself to presentation in different media to correspond to different generational preferences. This advantage ensures redundant message content is communicated to all users to understand the same meaning. Stating a redundant ICE message, regardless of media, eliminates variation in how it is stated and the potential for different interpretation from different

wording. Marines understanding a common message should encourage a reinforcement learning element where fellow Marines can help each other, as well as the transference element where Marines uniformly apply the knowledge correctly when needed.

A consistent SBI format would help the Marine recognize that he/she has found the training information and can quickly locate specific information needed to be understood. We think the standardized nutrition information on most packaged food is a useful analogy. The reader knows what, and generally where, to find the information needed to make decisions about using the product without difficulty. For example, if the consumer is dieting he/she will gravitate to one or more of the fat, carbohydrates and protein content in the upper third of the information, or if he/she has food sensitivity then the ingredients listed at the bottom will be carefully reviewed. We envision SBI would provide similar recognition and ease in understanding the information needed. Finally, preparing an SBI for each ICE facilitates updating training to ensure the right information is available. We expect a new SBI can easily be substituted for an old SBI without requiring a revision to all of the ICE training.

Given there is no planned ICE training today, a small block of instruction will need to be added to implement ICE SBI at the schools of interest and pre-deployment Block I unit training. Undoubtedly, we expect adding ICE instruction will be initially rejected by those directly impacted because there is not enough time in already overburdened schedules and a prevailing attitude that ICE training is not needed. The training block duration could be minimized to limit schedule impact and help alleviate some resistance.

An obvious training approach for pre-deployment training at home stations is using computer based ICE SBI on the “Marine Net” continuous learning source. In the current school setting, effort will be needed by TECOM and SOI to find the best opportunity to implement SBI within the current curriculum. In the absence of computer based learning at the selected schools, we expect schools can minimize the training block if they implement instruction that takes advantage of Millennial generation preferences to be collaborative in nature and allows the student to apply what they have learned.

If the decision to add ICE SBI instruction is left to the schools, we predict it will not occur given their overburdened schedules. Adding instruction needs to be endorsed at the senior executive level for this fundamental infusion of needed basic training to occur. In summary, the realization of increased and pervasive personnel efficiencies directly tied to Marine combat effectiveness must outweigh schools' scheduling constraints. We interviewed the 32nd Sergeant Major of the Marine Corps (SMMC) Alford McMichael (retired) to gain his leadership perspective on ICE training value. His perceptions provide some optimism that senior leadership will recognize and endorse changes in ICE training based on operational benefits. When we recommended adding the ICE instruction block, SMMC McMichael (retired) said:

It will be difficult because the first thing they'll say is we don't have any time on the schedule. However, they (the schools) are looking at it backwards. They are looking at added hours to the curriculum when it is saving time in the curriculum with effective performance! You have more time because once the Marine fully understands how to get the maximum performance out of the gear; they have less time stopping and re-teaching poor performance.

C. TRAINING COMBAT INSTRUCTORS TO USE SBI TRAINING METHOD

To teach new entrants by the SBI approach, the schools of interest need to adopt a standardized ICE training approach that is consistently administered by the Combat Instructors (CI). To implement this standardized ICE instructions, CIs must learn the ICE SBIs and teach its standards rather than strictly rely on their personal experience that was identified in Chapter III. When CIs train the ICE SBI content, we believe it assures that a more accurate and consistent message is delivered. Additionally, selective wording in SBI addresses basic needs to motivate the adult learner to understand the message in the pedagogy training environment.

1. Scope of ICE Training for Combat Instructors

As previously mentioned in Chapter III, the CI panel interviewed recommended Marine Combat Instructor Course (MCIC) provide better ICE training for new CIs. The

panel indicated “There is no standardized method for ICE instruction and it is very individualized, where the quality of ICE training provided to students is a function of the CI experience.”¹⁰⁰ Consequently, improving ICE instruction starts with the CIs understanding full ICE capabilities before we can expect their students to be properly taught.

We followed up with each school of interest and found no standardized ICE instruction is provided to CIs. Consequently, we will limit our comments to MCIC, since we found they implement the most formalized CI training program. MCIC trains a large cadre of approximately 360 CI per year, where the training prepares the CI for his/her three-year duty assignment. We interviewed MCIC to establish how ICE is trained and found it includes about a 30 minute ICE overview where any specific ICE details are addressed if students raise questions. New equipment video is shown if it is available. This minimal training level reinforces the CI panel recommendation that improvement is needed to increase CI ICE understanding if we are to maximize the learning potential available from the SOI new entrants. We asked Gunnery Sergeant McGuire, current SOI – East Chief Instructor, about his willingness to increase ICE CI training and he indicated “That’s not required. About 98% of our instructors are combat vets (from Iraq or Afghanistan) who have first hand knowledge of the (ICE) items.”

¹⁰⁰ D. White, G. Camina, A. Abrams, B. Brooks, L. Lowe, B. Williams, and H. Alonzo, 2007. Interview by D. Townes, Tape recording, April 17, 21008. School of Infantry – East, Camp, North Carolina.

TASK:	Properly wear the combat helmet to increase ballistic protection and survivability in combat.
CONDITION:	Continuous wear for ballistic protection without interference and increased comfort.
STANDARDS:	A. Helmet stability and fit is achieved with <u>3 adjustments</u>: 1. Adjust the internal headband to fit snug but comfortably round the head. 2. Position the side chin strap to rest below the ears and the chin cup fits snugly around the chin when fastened. 3. If needed, reposition the chin strap buckle to the cheek opposite the weapon firing position to avoid interference. B. Position the helmet brim level with the eyebrows for proper ballistic head protection. C. Tighten chin and neck pad straps so the helmet stays level and stable where it does <u>not</u> tip forward in prone firing position, and does not moves when your head is jerked side to side, up and down which increases fatigue. D. Clean off dirt and sweat with brush and soapy water to prevent a rough surface rubbing against your skin. Rinse completely and air dry.
TROUBLESHOOTING:	
Instability	-Do not rely solely on tightened chin strap -Be sure the neck pad straps are pulled evenly tight on both sides -Helmet must be level to avoid hitting body armor when prone -Inspect for broken stitching or damaged hardware; buckles, snap or Velcro that does not allow proper tightening
Discomfort	-Loosen head band and/or chin strap -Inspect for internal protrusions for pressure points -Clean interior dirt and grim that is toughly rubbing skin
Exposed fiber	-Turn helmet in. Hit by projectile or misused

Figure 7. Improved Helmet SBI Improved to Appeal to Wide User Population

We see an opportunity to improve CI ICE training because the majority of new CIs are war veterans. We believe combat instructors, who are veterans and come to understand full ICE capabilities by learning the SBIs during CI training, will be the most effective trainers. These CI will be able to draw upon their combat experience to explain how utilizing full ICE capabilities can enhance combat effectiveness and quality of life to these new Marines who will be deployed within the 12 months. New entrants will understand and retain the information when CI's present ICE information in a simple, concise matter and incorporate their actual experiences in a story format. The CI presentation should incorporate expected results from improper or proper use of ICE in the field. The CI's presentation would involve emotion which would make the presentation stick with the new entrants for a longer period of time.

Finally, we believe the CI SBI training should be augmented by teams that travel to Marine Corps bases to provide new equipment training. The purpose of NET team training would be to ensure the curriculum has been updated, and those implementing the curriculum understand the SBI and can seek clarification if needed. The NET team visit also provides an opportunity to CIs at those locations to see the demonstration and obtain the new training to train their colleagues in kind.

D. SUMMARY

Marines can be motivated to understand the training information and instruction associated with ICE by applying appropriate learning strategies. Entry level training is a structured training program in which the participant is told what to learn, how to learn it, and when to learn it, e.g., completely involuntary as new entrants have no input into their initial training. Experienced Marines bring both experience and a need of understanding into their learning experience. By understanding there is a difference between the new entrant and experienced Marine learning characteristics, learning elements can be incorporated into the training information to maximize both groups' understanding and retention of training information presented.

We present three components to enhanced Marines ability to understanding ICE capabilities once the message is noticed: adult learning elements, Heath's principles of stickiness, and Maslow's Hierarchy of Needs. All components are not necessarily utilized simultaneously, but strategically integrated as a purposeful system of ICE training. Strategic application of the principles to help communicate ICE capabilities will maximize Marines' understanding, retention and transference of this force multiplier composite. Marines' early and reinforced exposure to ICE capabilities is directly reflective of the axiom "train as you fight," and yes, resistance is expected, and must be channeled and managed. Incorporating Maslow's Hierarchy of Needs, i.e., biological, physiological and safety needs, with adult learning strategies (story format) is simple and modern, and is needed now.

TECOM's traditional Standards Based Instruction (SBI) provides an efficient training approach for ICE NET with its straightforward elements defining task, conditions, and standards. SBI is well understood and practiced throughout USMC training, and it provides the brevity advised for ICE. SBI accommodates all Marine users, and is well suited for the "school circle" commonly used in our schools of interest. Most importantly, the SBI provides simple and explicit standards that provide essential criterion for use to better assure that what is not intuitive about ICE can be quickly read and understood. Additionally, the SBI format can be used in different training media to appeal to different generational preferences, while providing a consistent, redundant recognizable message to avoid conflicting interpretations.

We believe we can enhance SBI understanding while maintaining its brevity. These changes include adding simple illustrations to create visual cues that new generations prefer and including selective words that motivate adult learners by appealing to their basic human physiology and safety needs. Finally, we suggest expanding the SBI to include a fourth element, namely troubleshooting, to help CIs and experienced Marines more easily solve ICE problems. Troubleshooting will also help the CIs train their large classes of new entrants who are exposed to equipment for the first time and will likely

have difficulty using the new equipment properly. Troubleshooting helps the experienced Marine adult learner with information that addresses learning elements of reinforcement and transference based upon knowing how to use the items correctly.

We believe the fundamental weaknesses in training ICE at our schools of interest lies in the lack of standardized ICE training and insufficient CI preparation to train ICE. To implement a standardized ICE SBI approach, it is contingent upon CI's dispensing thorough ICE SBI knowledge to their students. Common and consistent CI ICE knowledge by all CI could allow them to deliver improved ICE training that is currently hampered by limited or inaccurate interpretations of ICE capabilities.

To implement a standardized ICE SBI training approach, we believe it is necessary to add instruction blocks in both the CI training curriculum to provide them the understanding of the equipment they will train, and at the schools to institute meaningful ICE training. We expect strong resistance to adding training given a unanimous complaint that "there is not enough time." We strongly agree with the assessment from SMMC McMichael (retired) that time spent upfront will save time later in the curriculum and during missions, while at the same time improve Marines' performance and protection.

VI. PRACTICING NEW ICE KNOWLEDGE

In Chapter III, we identified a gap between performance capabilities engineered into new ICE items, and transference of those capabilities into Marine acceptance and usage, i.e., insufficient training contribute to knowledge deficiencies. In Chapters IV and V we discussed methods to increase Marines' cognitive abilities to notice and understand ICE training, including systematically reducing the capability knowledge gap. In this chapter, we identify three actions that can be applied at different learning opportunities to promote and reinforce Marines' understanding of ICE capabilities. First, an introduction phase during initial fielding to enable suppliers and trainers to understand new capabilities prior to transferring equipment knowledge to recipient Marines. Second, reducing training group size practiced in the Marines "school circle" approach would increase students' likelihood of successfully imitating trainer's demonstrations. Lastly, small unit leaders can be charged with reinforcing proper ICE use and care, i.e., adaptive reinforcement. Implement these three planned actions, and transform training message distribution. Purposefully craft the ICE message to capture the *notice* of the 95 percent preponderance of young(er) Marines (Chapter IV). Build in process-time up front where it belongs and let Marines practice as they will fight.

A. PLAN AN INTRODUCTION PHASE AS PART OF NEW IE FIELDING

We believe current ICE fielding practice overlooks the value of introducing new ICE equipment to supply elements of the schools and CIFs. Current fielding practice is limited to distributing equipment quickly and efficiently, but it does not communicate new and added capabilities of specific ICE items. The impact of current fielding practices on communicating new equipment capabilities are discussed in the next section.

1. Operating Forces: New ICE Fielding Practice and Consequences

Chapter III reports approximately 10 to 12 new ICE items are fielded per year to overcome combat performance shortcomings. PM-ICE requires two to three years to

field the full operational capability (FOC) to support readiness across the USMC. Fielded inventory is located at each MEF's Central Issue Facilities (CIF) which issues ICE to Operating Forces. New ICE fielding is dictated by PP&O descending priority.

The monthly fielding rate is based on a forecasted funding stream designed to sustain an uninterrupted economical production quantity over multiple years to reach FOC and minimize supply risk. The fielding plan starts as soon as the first deliveries are available. This varies with every new ICE item based on: available funding, when the contract is awarded and deliveries begin, fielding priorities, and a sustainable economical production quantity. These fielding characteristics result in the CIF continually adding new items to their inventory in an unpredictable manner. Consequently, there are continual adjustments at the CIF to accommodate record keeping of new items received, inventory management to phase-in the new ICE and phase out the old equipment, and frequent stocking of CIF shelves with new inventory for Marine issue.

The CIF is not expected to provide any new equipment training nor is new equipment training information provided at the CIF by signs or distributed training material when Marines receive ICE items. The consequence of this fielding practice focuses CIF resources to keep up with inventory management. They have neither the time nor the resources to provide training information to Marines at the CIF. Although the purpose of new ICE is to increase Marine performance, the fielding practice does not appear to be connecting Marines with the particulars of newly issued equipment. This crucial handoff unfortunately, is where systemic bad habits begin.

2. New Entrants Infantry Training: New ICE Fielding and Consequences

Chapter III reports only some new ICE items are fielded to SOI, OCS and TBS, which can occur as long as three years after fielding ICE to the Operating Forces. As discussed in Chapter IV, this practice prevents the USMC from taking advantage of the increased learning opportunity that will occur when new Marines are first introduced to the items and where training is the priority. This practice also does not train new Marines with the complete suite of ICE items they will fight with when they are part of the

Operating Forces deploying within 12 months. When the schools receive the new items, the Combat Instructors are not formally trained on how to use the item, and there is no standardized training instruction provided to train students to use an ICE item to its design potential.

3. Plan New ICE Introduction as Part of the Fielding Strategy

We believe new equipment introduction should be addressed when new ICE fielding begins. Limiting introduction of new ICE to a pre-determined schedule could enable the schools, CIFs, trainers and supply personnel to focus on new equipment items and information a few times per year, so they can understand and communicate its capabilities to Marines. Sufficient time periods would need to be dedicated to receiving new ICE inventory and information that does not conflict with the CIFs' and schools' duties to issue equipment and train Marines. Consequently, we attempted to characterize ICE issuing activity trends across the year to determine if there are preferable times to schedule new ICE introduction.

We characterized the activity trend of Marines processed through the CIFs and our schools of interest. We surveyed the II MEF CIF at Camp Lejeune as representative of what occurs at MEF CIFs. Mr. Corte-Real stated "The operational tempo that we are faced with from day to day is always at a 'high' scale."¹⁰¹ He went on to state "If there was a low (point), it would be the holidays, but we have been known to open on Thanksgiving, New Years, Martin Luther King Day and Labor Day (to satisfy a deploying unit)."¹⁰² On the other hand, our schools of interest who train new entrant Marines and their trainers do follow a predictable annual pattern. We plotted the schools' scheduled training across the year. In parallel, we plotted a straight line for the CIFs to represent the steady high demand with short breaks to capture holiday slow down. Figure 8 characterizes a representative activity trend at our schools of interest and the CIFs across the year.

¹⁰¹ D. Corte-Real, 2008. Interview by D. Townes, Telephone, September 15, Site Manager at Camp Lejeune Central Issue Facility.

¹⁰² Ibid.

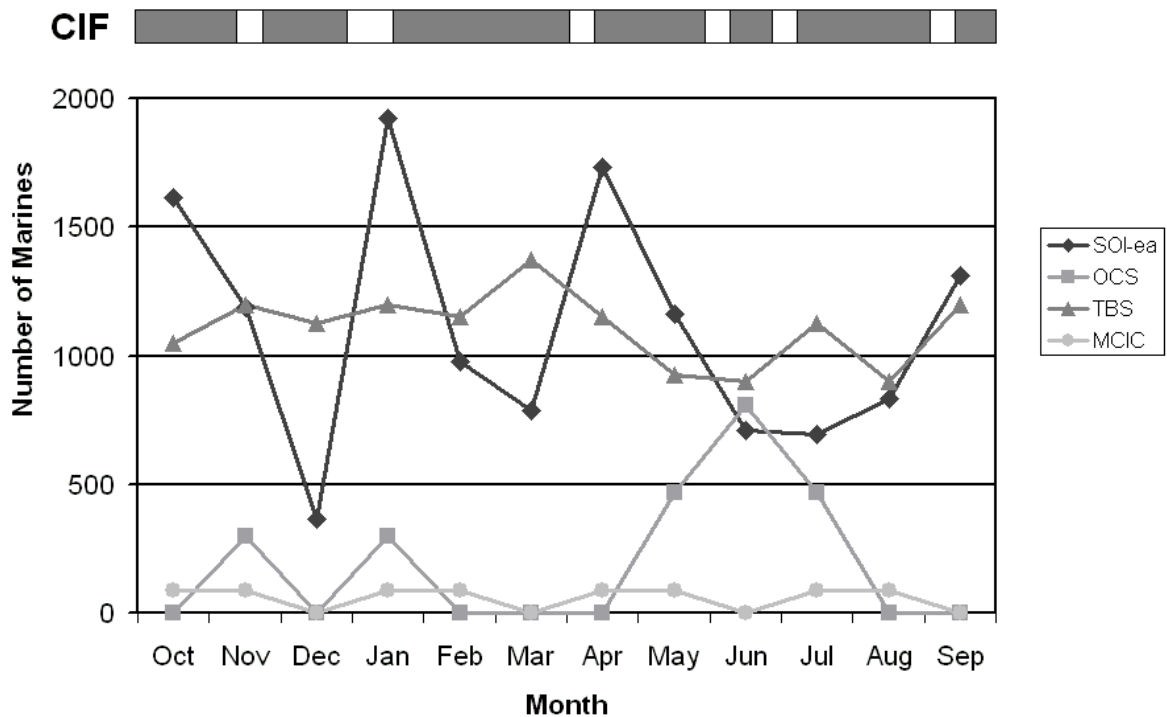


Figure 8. Profile USMC Exposure to ICE

4. Analysis of Annual ICE Demand to Identify Introduction Points for New ICE

We believe the organizations receiving new ICE should expect it at scheduled times and less frequently than the current “as soon as it is available” approach. Scheduled introduction points should enable organizations to plan for new ICE arrival, prepare the inventory for issuing to Marines, and increase efficiency by phasing in multiple new items fewer times per year as opposed to adding single new items 10 to 12 times per year. Equally important, we believe the selected introduction points should correspond to declining and slower activity periods. These slower-paced periods could provide personnel and time to manage and understand new equipment inventory, and implement training updates. Figure 9 identifies the selected introduction points that correspond to slower activity periods for the majority of organizations that need to issue new ICE and train Marines in its use.

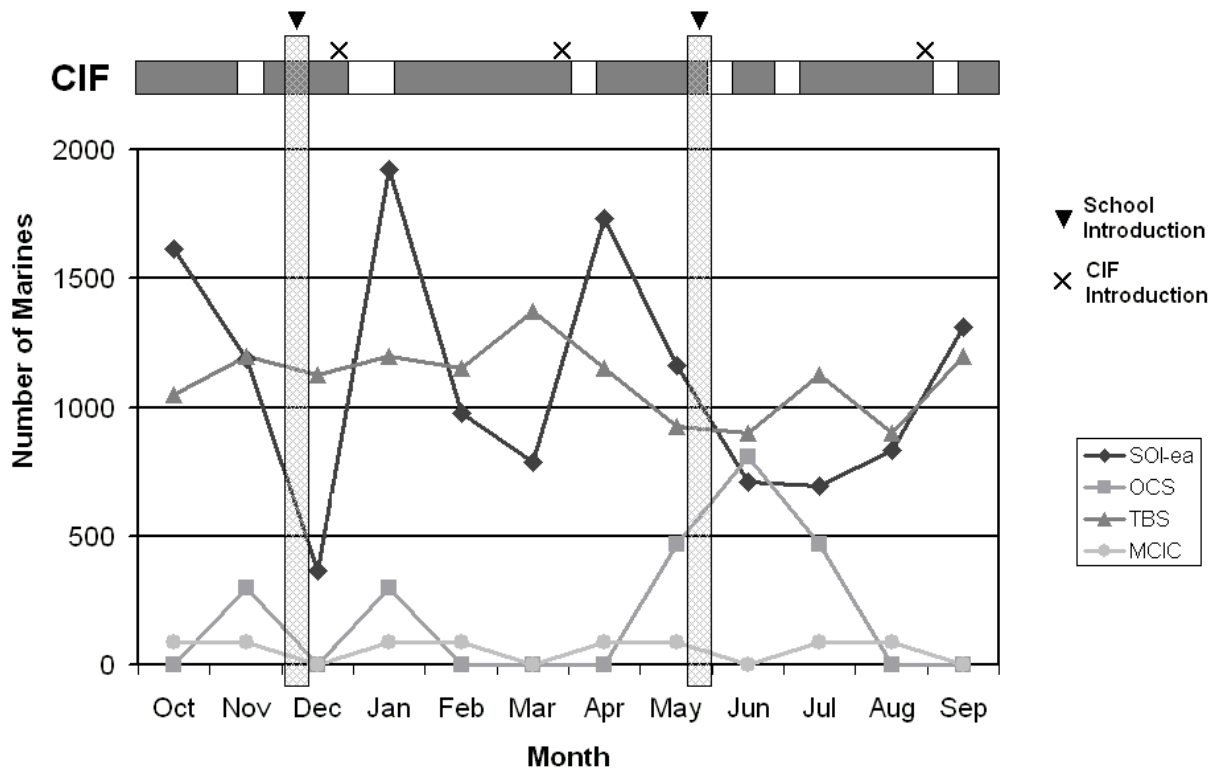


Figure 9. Selected Points in Profile USMC Exposure to ICE

We conclude from the illustrated annual activity trends that the shaded vertical columns, found in early December and latter part of May, are common slower activity periods for our schools of interest. The schools receiving new inventory and training information at slower periods is expected to help the schools' supply phase in new inventory, allowing trainers to become knowledgeable about new item capabilities outside busy training periods. OCS is an exception to the late May introduction point because this school schedules three sequential classes annually in late spring and early summer. To minimize the impact of introducing new items at OCS during their spring training build-up, we would shift their May introduction to late April or early May to de-conflict with their escalating activities.

Given the CIF's sustained high activity level, we believe it would be beneficial to limit and target new introduction to three times per year corresponding to the temporary slow down at holiday breaks. Assuming production quantities cannot support

introduction at both the schools and MEFs at the same time, we would select CIF introduction points that do not overlap with our schools of interest. Also, we would try to space the separation between the three introduction points as evenly as possible to minimize the delay in introducing new equipment and introduce a few items at each point. Based upon this selection criterion, the X's annotated at the top of Figure 9 indicate the three best holiday introduction points for the CIFs. These introduction points occur in the first half of January between New Years and Martin Luther King Day, late March to mid April corresponding with Easter, and Labor Day in early September.

When holidays occur, Marines based at their home station typically have "96 leave" authorizing four days (96 hours) continuous leave days including the adjacent weekend. The CIFs are generally run by civilian contractors who do not typically work holidays; however, they do not have the extended "96" hour leave that Marines are authorized. Consequently, with appropriate advanced planning, the CIF should be able to ensure there is enough staff at the scheduled introduction points to stock inventory and to post training information recommended in Chapter IV.

We also believe the CIF should be assigned the added responsibility to provide basic new equipment training when Marine units arrive for issue to be sure Marines notice new items and the training information. We envision this activity is a part-time job responsibility that could be dual-hatted with another position, as well as shared among a few staff members for redundancy.

The authors have witnessed the typical issue scenario that occurs at the CIF. The military unit lines up and waits to be allowed to enter the CIF and receive the gear authorized for issue. During this waiting period, we recommend that each group of Marines entering the CIF be given five minutes of new equipment introduction training which includes identifying the new items, describing the improved capability each item provides, highlighting correct use features that are not intuitively obvious, and communicating where to find new training information. We expect this brief introduction would need to be informative enough to catch the Marines' attention to motivate them to examine new items' features and seek training information.

Finally, fewer established new equipment introduction points would allow the MARCORSYSCOM NET Team and PM-ICE to synchronize visits with introduction points to further explain and demonstrate the new item capabilities to ensure maximum understanding by key organizations. These visits would be particularly valuable when the item is complicated or has high combat value, such as the body armor case previously mentioned in Chapter IV.

Numerous advantages, which are summarized below, are identified by scheduling and controlling new equipment introduction points to limited times per year: twice a year at schools and three times per year at CIFs. The only known disadvantage occurs when a unit deploys between introduction points. If this were the case, we would advocate that specific deliveries be arranged to the selected CIF for the identified unit.

ADVANTAGES OF PLANNED INTRODUCTION POINTS FOR NEW ICE

Introduction points become pacing milestones for PM-ICE to plan contract deliveries and update and distribute new equipment training information.

Organizations receiving ICE are aware it is coming so that supply can plan how to adjust inventory and trainers can take time to understand its capabilities twice per year rather than erratically and at unscheduled intervals several times per year.

- Introducing new equipment and training periods frees up some resources given lower demand for personnel to issue and train Marines.

- Increased reliability in updating training material for multiple items is expected. It is more likely that a single update that does not conform to a standardized training package will slip through the cracks with an attitude “I’ll get to it.” An analogy to this situation is the “action” stack or folder many office workers create when they are provided information that appears to be valuable but without clear expectations on what to do with it or when it is needed. This information is left to the side to be acted upon when the worker has time.

- For inventory available before the introduction point, PM-ICE can implement the “Bill and Hold” practice with contractors where inventory may accumulate for several weeks before an introduction point. The advantage of increased inventory is that FOC level might be achieved in a single shipment to a location.

- NET Teams visits would be more productive when they synchronize their visits with the schedule when recipients have just received new equipment and have increased interest in learning about it.

B. TRAINING CIRCLE GROUP SIZE

As stated in Chapter IV, approximately 40,000 young men and women either enlist or are commissioned into the Marine Corps each year. A new Marine must attend the School of Infantry, Office Candidate School, or The Basic School. In FY2006, an average of approximately 1,400 new Marines were trained at SOI-East per month based upon the data presented in Table 16. Each school is very structured with a limited amount of time to address specified material. As stated in Chapter III, Combat Instructors commonly use “school circles” to train up to 100 Marines at a time.

Table 16. FY 2006 SOI East Training

FY 2006 SOI-East Training				
Month	MCT Males SOI-East	MCT Females SOI-East		TOTAL
		ITB SOI-East		
OCT 2005	960	240	436	1636
NOV 2005	1353	288	467	2108
DEC 2005	330	80	7	417
JAN 2006	1737	270	891	2898
FEB 2006	871	226	210	1307
MAR 2006	451	159	456	1066
APR 2006	689	126	641	1456
MAY 2006	836	202	531	1569
JUN 2006	499	159	0	658
JUL 2006	533	155	480	1168
AUG 2006	757	166	307	1230
SEP 2006	857	183	600	1640
TOTALS	9873	2254	5026	17153

An internet search was conducted to locate information on effective group learning and training size. No research studies were found. The search was expanded to include effectiveness of college class size. One article was located, “Quality Education: Does Class Size Matter,”¹⁰³ that was found to be somewhat relevant to Marine’s “school circle.” The article concludes when higher order and complex reasoning is required for learning then the amount and intensity of faculty-student contact is not important.¹⁰⁴

¹⁰³ S. Gilbert, 1995. *Quality Education: Does Class Size Matter?*, April, Research File, Volume 1, No 1, http://www.aucc.ca/pdf/english/publications/researchfile/1995-96/vol1n1_e.pdf. (accessed October 4, 2008).

¹⁰⁴ Ibid.

However, we do not agree with this position based upon the direct experience of one of the authors and the questionable effectiveness we have found in Marines' current knowledge of ICE.

In 1995, author Connie Miles, experienced a version of the "school circle" during the Civilian/Soldier Readiness Exercise at Fort Benning, Georgia. As a young engineer with no military background, she volunteered to support Operation Joint Endeavor in Kaposvar, Hungary. All new Army civilians and Soldiers entering the theatre of operation were required to attend Soldier/Civilian Readiness Exercise. Approximately 75 civilians and soldiers attended this two week orientation and training for deployment preparation. What Connie remembers most vividly is going to the CIF to pick up her military gear - civilians were required to wear Army uniforms and utilize individual equipment while in theater. She walked in the CIF with 2 sheets of paper, and about 20 minutes later she walked out with two full duffle bags, a ruck sack and several items in her arms and hanging over her shoulders. She had no idea how to stow all her gear in these duffle bags and rucksack.

Once the civilians exited the CIF, the lead military instructor gathered almost 50 civilians around him in the "school circle" and demonstrated twice how to pack everything into one ruck sack and two duffle bags. During the demonstration, Connie was located somewhere in the middle of the group. She was eager to learn how to fit all her items into three bags. At her location, she was unable to hear and see all the instructions, therefore making it impossible to imitate the instructor's actions. The circle of 50 individuals was too large for her to receive the information that was provided even though she was highly motivated and attentive. After the demonstrations were over, Connie sought out a Sergeant from her command for additional assistance with packing her gear. She was able to stow most, though not all, of her equipment in the bags provided. Even when she returned home after 169 days of deployment, she still was not able to stow all her gear into two duffle bags and one ruck sack since she did not master the technique initially trained.

We believe that Connie's experience is typical of new Marines receiving similar instruction in their early training at SOI, OCS or TBS. Like Connie, new entrants are both motivated and attentive to the CI in the center of the "school circle" given they are provided with new information that addresses their well-being and they are relatively inexperienced. Chapter IV school training characteristics identify that approximately 100 Marines encircle one CI to receive the key characteristics of ICE with up to five CIs circulating among the students to inspect and correct the student's effort. It is our belief that in a Marine circle that is twice the size that Connie experienced, these Marines must encounter similar problems hearing the instructions, seeing the demonstration, and missing one-on-one correct feedback given the disproportionate student - instructor ratio. With an approximate monthly average of 3,000 new entrants trained Corps wide, CI uses the "school circle" as an efficient approach to train new entrants. However, based upon Connie's experience, we assume the training effectiveness of the "school circle" is not maximized when the CI cannot maintain the new entrants' attention during the introduction because the student cannot see or hear CI instructions.

1. New Entrant Group Training Analysis

As stated in Chapter IV, "school circle" offers some learning compatibility with the Millennial generation given their predilection to apply what they learned, but we believe that a "school circle" of 100 is too large to effectively train new ICE items to new Marines. We believe the "school circle" should be limited to a maximum group size of 50 students or less, whenever possible. We believe that the "school circle" should be as small as the schools can tolerate without imposing an extreme time burden on them. The size reduction would enable the new entrants a better opportunity to see, hear, and imitate the information being demonstrated, thereby motivating the Marine to act upon the information and use ICE properly.

2. Experienced Marines Groups Size Analysis

“School Circles” are occasionally used with experienced Marines. Table 17 below delineates the size of the first five discrete operational units in the Marine Corps¹⁰⁵ The Company size unit --125 Marines-- is approximately the size of the “school circle.” We believe when “school circle” is practiced within the Operating Forces that it should not exceed the platoon level of 41 Marines. The smaller squad level unit size of 13 is preferred since it would better ensure all the Marines can see the demonstration, hear the instructions and be able to receive immediate reinforcement. Section C of this chapter will further explore the role of leadership of small unit size to help Marines act upon ICE training information.

Table 17. USMC Operational Unit Size

Units	Rule of Three	Unit Leader(s)	Total
Fire Team	3 Marines	Corporal or Lance Corporal	4
Squad	3 Fire Team	Corporal or Sergeant	13
Platoon	3 Squads	Lieutenant +Sergeant	41
Company	3 Platoons	Captain +Sergeant	125
Battalion	3 Company	Lt. Colonel +Sergeant	377

C. ACTING ON ICE INSTRUCTIONS THOUGH SMALL UNIT LEADERSHIP REINFORCEMENT

1. Small Unit Leadership Inspect, Correct and Reinforce Understanding

Separate interviews with TECOM and the SMMC Michael (retired) echoed the same recommendation to enforce proper ICE use by following their military culture’s

¹⁰⁵ United States Marine Corps Commands. <http://www.usmc.mil> (accessed September 22, 2008).

adherence to process and procedures.^{106 107} These interviews similarly echoed that this enforcement role is naturally aligned with the USMC small unit leadership.^{108 109} The small unit leader's role develops and reinforces their Marines' knowledge, skills and abilities to optimize the unit's combat effectiveness.

Our subject matter experts recommend the Cpl Fire Team, the Sgt Squad Leader and the 2nd Lt Platoon Commander, found in the previous Table 17, should inspect and correct ICE proper use and care by the Marines under their charge. These three positions lead the smallest tactical units that execute discrete tactical tasks that collectively accomplish their battalion's mission plan. The ongoing leadership responsibilities that are part of these positions provide the motivation, oversight, and redundancy that assure ICE enforcement. By ensuring the Marine understands ICE capabilities and practices ICE correct use, the leadership is developing the ICE knowledge, skills and abilities in conjunction with the Marine common combat skills (MCCS) that are required for deployment. In short, ICE knowledge and correct use and combat effectiveness become tightly connected.

SMMC McMichael (retired) stressed including a "maintenance campaign" as part of the ICE utilization continuum given its importance in retaining the items' capabilities for sustained combat effectiveness. He indicated that every program has a "maintenance management" allocation. For the individual Marine, maintenance management focuses on his/her physical training, professional reading, and education practices to develop the Marine's effectiveness and individual growth. SMMC McMichael (retired) recommended adding ICE instruction to the individual's maintenance management given its value to the Marine in saving time and increasing combat effectiveness and survivability. He recommended the maintenance campaign will have maximum

¹⁰⁶ A. McMichael, 2007. Interview by D. Townes, April 28, 2007. Sergeant Major Marine Corps, Crystal City, VA.

¹⁰⁷ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008, Interview by D. Townes, Tape recording, May 4. Training and Education Command, Quantico, VA.

¹⁰⁸ A. McMichael, 2007. Interview by D. Townes, April 28, Sergeant Major Marine Corps, Crystal City, VA.

¹⁰⁹ J. Dennison, T. Hartshorne, B. Schultis and S. Ruiz, 2008. Interview by D. Townes, Tape recording, May 4, 2008. Training and Education Command, Quantico, VA.

effectiveness if we “reach out and make sure information is adaptable to Marines electronic ‘comfort zone’ and not limit training opportunities to the old culture.”¹¹⁰ His reach out recommendation coincides with our Chapter IV recommendations to appeal to changing generational preferences.

SMMC McMichael (retired) effectively summarizes this chapter’s objective. He stated “If instructions provided are understood, we need to hold Marines accountable for complying with them.” He went on to add that “It is no different then the policy USMC has today for safety, alcohol abuse, sexual assault, being somewhere at appointed time etc. We hold Marines accountable for this – but when it comes to equipment to keep them alive – we don’t put the same energy into it!” His concluding rhetorical question seems impossible to refute when he asked “Isn’t following proper use and maintenance important to help (Marines) survivability and lethality in the field?”

2. Small Unit Leadership Analysis

For small unit leaders to inspect and correct proper ICE utilization, they must be trained on ICE capabilities and standards. The same training material and rationale recommended to train Combat Instructors (CI) in Chapter V is also appropriate to train all small unit leaders. Consequently the same CI ICE training curriculum needs to added to the unit leader courses listed below.

<u>Leader</u>	<u>Training</u>
Corporal	Tactical Small Unit Leaders Course (TSULC)
Sergeant	Infantry Squad Leaders Course
2 nd Lieutenant	Basic Officers Course

¹¹⁰ A. McMichael, 2007. Interview by D. Townes, April 28, Sergeant Major Marine Corps, Crystal City, VA.

D. SUMMARY

We believe introducing new ICE is overlooked in current fielding practices. We recommend an introduction phase be a scheduled event during fielding, enabling our schools and CIFs to plan for ICE arrival and inventory managements, and communicate new capabilities and benefits, i.e., the reason for the ICE fielding. We recommend that the scheduled introduction points be twice per year for the schools and three times per year for the CIFs. We expect the receiving units will more favorably notice new items and implement training information when its frequency is reduced and they are able to prepare for it during slower activity periods.

The “school circle” can be an efficient technique to train the approximate 3,000 new entrants Marines per month at SOI, OCS, and TBS; however, we believe the “school circle” size should be reduced from approximately 100 Marines to about 50 Marines or smaller groups whenever feasible. By reducing the number of Marines encircling the Combat Instructor, the Marines will have an enhanced opportunity to accurately act upon the information received. The smaller “school circle” will better allow the Marines to see, hear, and imitate the information being demonstrated. Furthermore, when the “school circle” is used with experienced Marines, we believe it should be limited to the size of a platoon-- 41 Marines--or better yet the squad size of 13 Marines.

Subject matter experts agree that once Marines gain initial understanding of new ICE capabilities, the Corps needs to rely on small unit leaders to inspect, correct, reinforce and enforce proper use and care. Proper ICE utilization falls within the Marine Corps’ culture to adhere to process and procedures. Ensuring adherence is naturally aligned with the Marines small unit leaders who develop Marines knowledge, skills and abilities to be combat effective, which is supported by ICE capabilities.

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VII CONCLUSIONS AND RECOMMENDATIONS

A. PROJECT PROBLEM AND AREAS STUDIED

The Program Manager (PM) for Infantry Combat Equipment (ICE) provides the United States Marine Corps (USMC) with a suite of personnel clothing and individual equipment to increase the Marines survivability and mobility so they can operate on the battlefield longer and more effectively than the enemy. The design features and adjustability of new ICE items requires new knowledge, including getting different generations to notice, practice and use items to realize maximum performance. Unfortunately, current ICE new equipment training (NET) appears ineffective in connecting Marines with the full potential of emerging personal clothing and equipment to systematically and comprehensively improve operational performance. There is little formalized ICE training, which leaves Marines to learn how to use ICE based primarily on previous experience. The issue is that items such as helmets and sleeping bags have shifted into improved technological designs, not necessarily reflective of one's experience or intuition using a somewhat similar item. Trial and error techniques or incorrect advice from fellow Marines' sustains the cycle described in this study as a disconnect. These learning methods may be expedient with the unintended consequence of missing or negating technological advantages on the battlefield.

So what changes and influences can PM-ICE undertake to improve Marines' understanding of ICE benefits to maximize individual and unit performance and survivability? Our study recommends strategic process changes that we expect will substantially improve Marines' abilities to notice and absorb ICE knowledge, eventually infusing usage within the cultural axiom of train as you fight.

We examined processes, procedures, instructions, practices and constraints related to ICE development, fielding, and training to identify factors contributing to Marines' underutilizing ICE capabilities. We focused on these factors to recommend training improvements that are compatible with schedule and funding constraints, Marine culture, and Marine Corps population characteristics. The improved ICE training strategy we

recommend increases Marines' ability to notice ICE training, improves their ability to understand its training message, and reinforces newly gained ICE knowledge to habitually use ICE correctly.

B. PROJECT CONCLUSIONS

Our data and analysis identifies six corrective actions below, which we expect will increase Marines' use of ICE capabilities to improve his/her performance. The rationale and recommendations for implementing each action are presented in the remainder of this chapter.

Corrective Actions to Improve New ICE NET Process

1. Incorporate generational preference and adult learning strategies when preparing ICE NET to increase Marines' ability to quickly notice and easily process ICE information.
2. Train ICE according to the USMC creeds "Train at First Exposure" and "Train as You Fight."
3. Prepare standardized ICE training using Standards Based Instruction (SBI).
4. Implement formalized SBI ICE training for instructors, students, experienced Marines and small unit leaders.
5. Leverage small unit leadership to reinforce and enforce proper ICE use and care.
6. Introduce new ICE systematically when initiating its fielding.

C. PROJECT RECOMMENDATIONS

1. Incorporate Generational Preference and Adult Learning When Preparing ICE NET to Increase Marines' Ability to Quickly Notice and Easily Process ICE Information

We recommend applying generational preferences and learning strategies that correspond with the USMC population characteristics when improving ICE NET. The principles are summarized here while the recommended applications are discussed in corrective actions two and three to more clearly show their role and intended effect.

a. Generations within the USMC Population and Their Preference

The most defining statistics from the USMC population of 219,000 find they are 92% male, 90% enlisted and 10% officer rank, and less than 5% are older than 40. The USMC age distribution finds the current Marine population can be categorized into 3 generations: 65% Millennial, 30% Generation X and 5% Baby Boomers. The Millennial population will continue to grow each year as Marines from the other generations leave or retire. The general core values, motivation, and training traits of each generation influence how its members process and notice information, which we factored into updated ICE training messages.

Millennial is the largest generation, born after 1980, and the first generation to have access to computers in their home and in the classroom. Millennial exposure to electronics at an early age enable them to notice and process information quickly when presented in the form of video and computer games. Their need for speed makes for example messages on a scrolling banner an effective way to transmit information. Generation X, born from 1960 to 1980, is comfortable with receiving training from computers but prefers to learn from trial and error than to read long passages. Also, they respond well when they are involved in tasks where they can get immediate feedback. Finally, the smallest and oldest generation is Baby Boomers born after 1944, often preferring lectures and printed text.

We recommend multi-generational messaging tools to make training information messages stick for the three generations of Marines. As indicated earlier, these messaging tools are identified in corrective actions two and three that follow later in this chapter.

b. Learning Strategies

All Marines in the Operating Forces are adult learners for whom learning is voluntary, problem centered, based upon current need, and requires use of flexible learning structures (ref andragogy attributes). Flexible learning occurs when Marines have the opportunity to read or scan the instructions, access the PM ICE or Training and Education Command (TECOM) websites to obtain additional information on equipment, or obtain information from the proposed electronic banner. The adult learners' training information needs to address four elements for them to understand training information: motivation that appeals to satisfying physiological and safety basic needs, reinforcement to encourage correct behavior, retention of information to receive its benefit, and transference to apply information as situations dictate (ref principles of adult learning). Motivation and reinforcement learning elements are addressed in the "Train at First Exposure" and standards based instruction (SBI) training recommendations. Retention and transference elements are discussed in the "Train As You Fight" and small unit leaders' role recommendations.

2. Train ICE According to the USMC Creeds "Train at First Exposure" and "Train as You Fight"

TECOM and Combat Instructor (CI) subject matter experts (SME) echoed two credos to train Marines to be combat effective: "Train Marines At First Exposure" and "Train As You Fight." We believe practicing these creeds where ICE is concerned will result in significant improvement in Marines' understanding and proper use of ICE. These creeds are validated by the negative outcome of the training approach taken for the Modified Tactical Vest (MTV) case described in Chapter IV. MTV was an urgent and compelling solution to overcome shortcomings found in the current body armor during Operation Iraqi Freedom (OIF). The urgent and compelling basis completely bypassed

infantry training of new Marines and focused on NET teams training Marines to train fellow Marines in their deploying units. We believe the MTV training approach was a major factor in the low acceptance of MTV by the Operating Forces and the PM-ICE's need to engineer another solution. First, it is unlikely there was any meaningful MTV training occurring with deploying troops because of the low likelihood they noticed training when faced with numerous priorities to prepare for deployment, combined with the common sentiment that training was not needed given experience with a similar item. New Marines, who would follow in the next deployment within the year, were not exposed to MTV during infantry training and, consequently, will encounter the same training characteristics and pressures in pre-deployment preparations.

a. "Train Marines at First Exposure"

TECOM advocates teaching all new Marines ICE at first exposure. ICE NET needs to seize this opportunity given that Marines are at their most impressionable stage for new learning during first exposure to ICE. The best opportunities to train ICE at first exposure would occur at the three schools that TECOM points out trains all new Marines. The selected schools are the School of Infantry (SOI) for all new enlisted, and Officer Candidate School (OCS), and The Basic School (TBS) for new officers. Corrective action number three in the next section specifies standardized ICE training that we recommend occur at the selected schools.

Experienced Marines, who are beyond the selected schools are first exposed to new ICE at the Central Issue Facility (CIF) found at each Marine Expeditionary Force (MEF). No training is currently provided at the CIFs. Experienced Marines are self taught so it is critical they notice new ICE instructions to increase the chance they will use it and overcome their natural inclination to rely on intuition, experience with similar item, and trial and error. The MTV training example supports this point. Marines felt their experience with the predecessor armor was adequate to figure out how to use the newer version. While Marines could wear the new MTV, they

experienced discomfort, interference, and protection vulnerabilities because they lacked knowledge to adjust the vest to fit snug and comfortably next to the body with proper ballistic overlap and armor placement for its intended protection.

For an experienced Marine to notice instructions, ICE training information would need to be posted and distributed at the CIF, which is not practiced today. Multi-generational message formats could be presented in CIF locations in different media providing purposefully redundant messages appealing to all three generations. The recommended CIF training information is listed below.

CIF Multi-Generational Message Media Tools

- Place a placard at the bin where the Marine will retrieve new ICE. The placard must identify key points that the Marine needs to notice and should include a picture.
- Distribute pocket size booklets that list and illustrate the standards for using new ICE for the Marine to take and read.
- Use video media at the entrance and exit of the CIF. The video should include electronic banner scrolling key points about new ICE and include short video segments demonstrating how to use new ICE and highlighting what makes the new item different from the one it replaces.
- Provide a hot link for new ICE on the Marine Homepage and MarineNet. Include a movie clip or video game at these cites to illustrate key ICE features.

b. “Train as You Fight”

TECOM and SOI Combat Instructors (CI) SMEs were unequivocal about the Marine ingrained cultural characteristic of “Train As You Fight!; however, the USMC’s fielding priorities to schools and the schools’ funding constraints create impediments to maintaining this preeminent Marine value. Currently, new Marines train

at the selected schools with a partial suite of ICE that includes earlier versions of some items as surrogate training equipment. The consequence of this practice may actually reduce combat readiness for new Marines deploying within 12 months.

We recommend enhancement and continued core focus on the “train as you fight” creed to optimize training, and to sharpen Marine competitive advantage across all missions and conditions. This recommendation requires identifiable and reasonable actions. First, HQ USMC’s Planning, Programs and Operations (PP&O) would authorize that selected schools receive all new ICE that Marines use and will use in combat. Elevate the schools fielding priority to ensure that the schools and students actually receive their future combat equipment for training. The current low fielding priority results in the selected schools receiving new ICE about three years after the MEFs or not at all. If ICE fielding improvement is made, then the schools need additional marginal funding to sustain training equipment inventories. Counterproductively, we found schools reducing their equipment budgets by using older and incomplete versions of ICE, and to meet budget constraints. The combat helmet case in Chapter IV found that the schools train new Marines with a combat helmet that is two generations earlier than what Marines wear in combat in Iraq and Afghanistan. Using an earlier helmet version conditions the Marine to head borne weight and the effects on sensory acuity. However, the shortcoming of using a surrogate combat helmet prevents the Marine from learning how to adjust the helmet for comfort, stability and compatibility with equipment and weapon firing, all of which have a direct negative impact on combat effectiveness.

3. Use Standards Based Instructions (SBI) as the Basis for Training New ICE

Formalized ICE training does not occur for two reasons. First, there is a Corps wide sentiment that ICE training is not needed since “it is so easy a caveman can do it”¹¹¹ Second, current training material is not straightforward and standardized to practice,

¹¹¹ Martin Agency for Government Employee Insurance Company, 2007, Tagline for GEICO Insurance Television Advertisement.

which requires added effort and skill to implement it. We believe ICE training would be improved significantly by PM-ICE preparing standardize ICE training content to Standards Based Instruction (SBI), as advocated by TECOM SMEs. SBI outlines task, condition and standards for the new items in a simple and efficient format. The SBI example illustrated below is an expanded version of TECOM's original example. It includes selected wording to address adult learners' needs that motivate them to meet basic safety needs with reinforcement of correct use through specified standards. All new illustrations must provide visual cues appealing to Generation X and Millennials. Simple statements appeal to the speed in information processing that the new generations seeks, while the list format satisfies typical Baby Boomers' information presentation expectations.

Combat Helmet with Sling Suspension

TASK:	Properly wear the combat helmet to increase ballistic protection and survivability in combat.
CONDITION:	Continuous wear for ballistic protection without interference and increased comfort.
STANDARDS:	A. Helmet stability and fit is achieved with <u>3 adjustments</u>: 1. Adjust the internal headband to fit snug but comfortably round the head. 2. Position the side chin strap to rest below the ears and the chin cup fits snugly around the chin when fastened. 3. If needed, reposition the chin strap buckle to the cheek opposite the weapon firing position to avoid interference. B. Position the helmet brim level with the eyebrows for proper ballistic head protection. C. Tighten chin and neck pad straps so the helmet stays level and stable where it does <u>not</u> tip forward in prone firing position, and does not moves when your head is jerked side to side, up and down which increases fatigue. D. Clean off dirt and sweat with brush and soapy water to prevent a rough surface rubbing against your skin. Rinse completely and air dry.
TROUBLESHOOTING:	Instability -Do not rely solely on tightened chin strap -Be sure the neck pad straps are pulled evenly tight on both sides -Helmet must be level to avoid hitting body armor when prone -Inspect for broken stitching or damaged hardware; buckles, snap or Velcro that does not allow proper tightening Discomfort -Loosen head band and/or chin strap -Inspect for internal protrusions for pressure points -Clean interior dirt and grim that is toughly rubbing skin Exposed fiber -Turn helmet in. Hit by projectile or misused

Inside View



Figure 10. Combat Helmet with Sling Suspension

SBI is well suited for the “school circle” training method commonly employed at our selected schools. SBI clearly provides the standards that the CI needs to conduct explanation and demonstration criteria, including ensuring student follow-through. SBI is compatible with multiple media presentation formats previously recommended for the experienced Marines ICE exposure at the CIF. These presentation formats must echo the same SBI message to ensure a consistent message is delivered. Message consistency help establish user expectations, enable the user to know when he/she has found the information and quickly obtain what is needed, and provide redundant message that will be understood without conflicting interpretation of its meaning. Finally, we anticipate an SBI would be prepared for each ICE item where SBI instructions can be easily updated by adding or substituting SBI for new items.

4. Implement Formalized and Standardized ICE Training

Given the availability of improved training material, the next step is implementing formalized standardized ICE training. We learned the quality of student training is a function of the combat instructors’ ICE experience. Since an infantry MOS is not required for most courses, it is likely the instructors do not have extensive knowledge of the role and value ICE capabilities have on combat effectiveness. We recommend standardized ICE training curriculum to be implemented for both those who train Marines, which are the CIs and small unit leaders, as well as the new Marines at the selected schools. We recommend ICE SBI curriculum be included in the courses listed in Table 18.

We fully expect adding ICE instruction blocks will be initially rejected due to overburdened schedules. This resistance is normal and can be used as a springboard for education. If one new Marine realizes that embracing equipment instructions translates into a better warrior, then resistance can be channeled towards performance. Imagine the power of this simple change magnified through the intense weight of senior officer and enlisted leaders? ICE training and sustainment – upfront where it belongs – defines

efficiency, interrelates the core value of “train as you fight,” and **is** a force multiplier. The most important outcome will increase Marine field safety and survivability, which is at the forefront of our intentions.

A simple case of the waterproof (WP) bag explains how brief standard instruction can reap the benefit intended. The WP bag lines the Marine’s ruck sack to keep his/her gear dry during prolonged rain, river crossings and amphibious landing. Waterproofing is dictated by proper closure which takes one minute to master with proper instructions. One minute can mean the difference between a restful night of sleep with dry gear or being uncomfortably cold from wet gear. Our leaders can positively impact this choice.

Table 18. Recommended Courses to Include Standardized ICE Block Instruction

- Combat Instructors Courses at: Schools Of Infantry (SOI)
 Officer Candidate School (OCS)
 The Basic School (TBS)

- New Marine infantry training at : SOI for all enlisted at both MCT and ITB
 OCS for all officer candidates

- Small Unit Leader Courses: Tactical Small Unit Leader for Cpls
 Infantry Squad Leader Course for Sgts
 TBS’s Basic Officer Course (BOC) for
 2ndLts

5. Leverage Small Unit Leadership to Reinforce and Enforce Proper ICE Use and Care

Improving ICE training is expected to increase Marines ability to notice and understand ICE capabilities; however, initial understanding always needs to be reinforced and enforced to ensure it is consistently practiced and infused into the culture. Both TECOM experts and the retired SgtMaj of the Marine Corps (SMMC) strongly indicate that promoting proper ICE use and care naturally aligns with the Marine Corps small unit

leaders' responsibilities. The small unit leaders are the Corporal fire team leader, the Sergeant squad leader, and the 2nd Lieutenant platoon commander. ICE SBI curriculum needs to be added to their leadership training so that they are equipped to inspect and correct their Marines' ICE use and care. Table 18 lists the small unit leadership courses that need to include ICE training curriculum. Three levels of leadership provide redundancy and support to better assure proper ICE use and care. We envision the fire team leader has the best opportunity to inspect and reinforce proper ICE use in this four man team. The squad leader motivates the fire team leader and has greater experience to correct improper use. The platoon commander engagement might be more macro, centered on enforcing ICE practices, being a visible role model, and assuming implementation responsibility. SMMC McMichael (retired) summarizes this well when he explains "If instructions are understood, we need to hold Marines accountable for complying with them. We hold Marines accountable (for other behavior for their well being) but when it comes to equipment to keep them alive – we don't put the same energy into it!"

6. Introduce New ICE Systematically when Initiating New ICE Fielding

Currently PM-ICE fields 10 to 12 new ICE items annually in an unpredictable pattern; consequently, the schools and CIFs cannot plan for these items' arrival. We recommend introducing new ICE according to a schedule to minimize disruption, increase efficiency, and optimize integration of the new equipment and information into the existing inventory. We also recommend new ICE introduction be limited to twice per year for the schools and three times per year to the CIFs. Finally, we recommend the new ICE introduction points coincide with the declining or slower activity periods so there are increased resources and less conflict with their mission to issue new ICE to Marines or train them in its correct use.

Figure 11 illustrates the annual activity trends at the selected schools and CIFs. The vertical bars identify the two introduction points recommended for our selected school, which are early December and late May, to correspond to slower activity periods at most schools. The Xs denote the three introduction points recommended at the CIFs

where new ICE needs to be at the schools immediately before the New Year/Martin Luther King, Easter, and Labor Day holidays. Available production quantities require the school and CIF introductions do not overlap. We attempted to space as evenly as possible these ICE introduction points to get the new ICE fielded as soon as possible without inundating the recipients with too much new ICE.

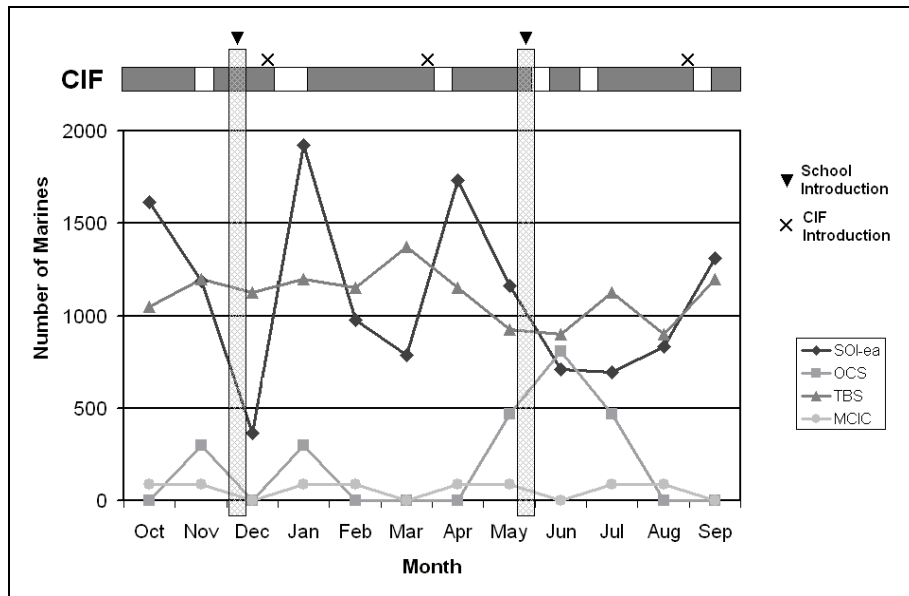


Figure 11. Selected Points In Profile USMC Exposure to ICE

D. FUTURE RESEARCH TO IMPROVE ICE NET

We believe there are three areas for additional research that would improve ICE NET, briefly described below.

1. Improve Labels Affixed to Every ICE Item

Every ICE item includes a permanent label affixed to the item in an inconspicuous area. This is the simplest form of embedded training and it is consistently practiced. However, today's labels prioritize information for supply personnel, are difficult to read and virtually impossible to read in a tactical environment, and provide negligible value to the user for whom it is intended. We believe the value and usefulness

of these labels can be greatly improved by applying research on readability, and improving font size, color contrast, size and placement while being inconspicuous in the tactical environment. Additionally we expect label information improvement can be gained by using concrete language, prioritizing the information that is presented, and including a reliable web link for detailed information that can be sought when at home base.

2. Study to Quantify Effectiveness of New ICE Training Improvements

We expect adding formalized ICE training at the recommended levels will be heavily resisted; therefore conducting a controlled study could generate statistical evidence supporting improved ICE training. The future study would involve a group that practices the ICE training with this study's recommendations and a control group that continues with today's ICE training practices. The study outcome could measure Marine proficiency and the time and cost needed to implement it. We believe it would be valuable to conduct this study in both the school setting and CIF. In addition to proving the value of ICE training, the study could be useful in identifying what adjustments are warranted to improve the training further before implementing it across ICE.

3. Interactive SBI for Web Based Learning

Currently, the USMC population is 65% Millennial generation, and within 10 years it will grow to 90% or more. To appeal to this predominant population, new training material should focus on electronic connectivity and interactive formats. Electronic formats will be the most useful for the experienced Marine who is largely self taught. Also, it will be available if TECOM adopts any computer based training at our schools of interest. We believe it would be worthwhile to investigate how computer gaming could apply to ICE training as an effective way to transmit the information and increase the message stickiness based upon their generational preference for speed and interaction.

E. SUMMARY

This study sought to uncover possible causes contributing to underutilized ICE, as Marines are not fully benefiting from ICE capabilities increasing survivability, mobility and quality of life, including combat effectiveness. SMMC Michael (retired) summed up the ICE dichotomy best when he said “Isn’t following proper (ICE) use and maintenance important to help Marines survivability and lethality in the field?”

We need to change a culturally ingrained misguided sentiment that ICE training is not needed when experience with a similar item, intuition, and trial and error will achieve the same results. This viewpoint overlooks newly emerging ICE capabilities to improve Marines’ performance and survivability. Our training improvement strategy addresses three objectives: get Marines to notice, understand and act upon training information. We identify practical adjustments within the existing process and culture that are easy to implement at low cost. Examples of these changes are basic where we provide standardized and straightforward ICE instruction when Marines are first exposed to new equipment, revised fielding priorities so Marines can “train as they fight” to prepare for combat, and reliance on small unit leadership to inspect and correct ICE instruction standards.

This updated training addresses generational preferences and adult learner tools to facilitate Marines’ understanding of new ICE. Finally, new equipment introduction is planned so new equipment and instruction can be coordinated. New Marines will deploy within 12 months of leaving SOI and TBS, while experienced Marines return to the theatre of operation for second and third deployments. Ten to 12 new ICE capabilities are fielded per year to overcome battlefield shortcomings identified by the Operating Forces at an investment of approximately \$350 million. Our goal is to ensure our Marines go forth armored with the best, and the best-utilized personal equipment in the world.

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APPENDIX

A. CALCULATION FOR THE NOMINAL ANNUAL LIFE CYCLE COST FOR ICE

1. Variable Values from Chapter III, Pages 1 to 2

Annual ICE Fielding Investment:	\$325M to \$350M
Average number of years of fielding to reach FOC	3 years
Average Number of Item Items Fielded Annually	12 to 15 items
Estimated ICE Item Service Life	15 years

2. Average FOC Cost (Min - Max) per ICE Item =

= (Minimum Annual Spending) x (Number of Years of Fielding to reach FOC)

Maximum Number of ICE items Fielded Per Year

= \$325M per year x 3 Years to reach FOC /15 Items Per year

= \$65 M minimum average FOC cost

= Maximum Annual Spending x Number of Years of Fielding to reach FOC

Minimum Number of ICE items Fielded Per Year

= \$350M per year x 3 Years to reach TOC/ 12 Items per year

= \$87.5M maximum average FOC cost

3. Total Qty of ICE Item Procured over It's Life Cycle

= Number of FOC Quantities Replaced x Average FOC Cost (Min or Max)

Minimum:

= 3 FOC quantities x \$65 M minimum average FOC

= \$ 195M minimum average life cycle cost

Maximum

= 3 FOC quantities x \$87.5 M maximum average FOC

= \$ 264M maximum average life cycle cost

B. MARCORSYSCOM'S MP&T ANALYSIS DETERMINATION TOOL

Instructions:

1. It is recommended the program office complete the answer portion of this document prior to convening the M&T Advisory Board for review.
2. Read each question carefully and provide detailed information in the space provided. Provide enough detail for the M&T Advisory Board to make an educated decision regarding the need to conduct a MP&TA. In cases where the requirements documentation lacks clear objectives, thresholds or expectations for manpower, personnel or training, the program office should request further guidance from MCCDC before proceeding.
3. Support responses with applicable references when known. When the answers are unknown (UNK), state: "To be determined by the analysis."
4. Convene M&T Advisory Board. After introducing the system, work through each question in Sections 1-4 and perform the following:
 - 1) Review and discuss each question. Provide a **YES**, **NO**, **UNK** (unknown), or **NA** (not applicable) decision by checking the appropriate box.
 - 2) Place the point value for each decision in the value (**VAL**) box.
 - 3) Each response is weighted as follows:

YES or NO	= 0 or 2 points (Boxes with asterisks receive the 2 points)
UNK	= 4 points
NA	= Exemption. Do not include in total score.
- 4) Once complete, total the **VAL** scores and record in the **TOTAL POINTS VALUE** space.
- 5) Remember to exempt NA responses.
- 6) Use the comments section to identify any specific areas of concern or focus.
5. Compare the score to the **RISK SCALE** provided. The scale assesses the risks to the program should the program office complete a detailed Manpower, Personnel, & Training Plan without a full or partial Analysis.
6. With the score in mind and Advisory Board consensus, determine whether or not a full or partial analysis is required. Place an "X" in the applicable spaces reflect the group's decision.
7. In the rare case that the Advisory Board determines a Manpower, Personnel & Training Plan is NOT warranted due to the nature of the acquisition, place an "X" next to the MP&TP decision paragraph and provide justification support the group's decision. Note: This decision does not negate adequately addressing manpower and training in required logistics documentation.

8. On the Advisory Board Signature Page, check the appropriate boxes and have each member of the board sign for concurrence.

9. The Logistician must prepare a memorandum for the record to the Program Manager indicating the decision and expectations for completing the MP&TA and MP&TP. Include this document as an attachment and forward in accordance with the Manpower, Personnel & Training Process.

1.0 SYSTEM DESCRIPTION

1.1 Describe the system being procured:
Provide 1-2 paragraphs that cover: 1) the capabilities, 2) characteristics, 3) components of the item/system, and 4) number of personnel required to operate, maintain and support the system.

1.2 Describe the Acquisition Strategy:
Describe the acquisition strategy (UUNS, AAP, CAT III etc.), acquisition objective, and anticipated milestone timelines.

1.3 Did the requirements documentation (UNS, JCD, ICD, and CDD) address manpower, personnel and training?	YES	NO*	UNK	NA	VAL
If so, describe implications to MP&T and any recommendations made. If not, describe actions taken to gather further guidance.					

1.4 Is there a predecessor or similar system?	YES	NO*	UNK	NA	VAL
Predecessor system: One that is in the USMC inventory and is doing, or has been doing, the required function or functions until the replacement system is fielded. Similar system: one that performs a different mission but has many of the same operational and maintenance characteristics. Similar systems may allow for transfer of Knowledge, Skills, and Abilities (KSAs) which the new system may model/adopt. For 'yes' answer, give the nomenclature/name of the system:					

1.5 Does the new system differ significantly from the predecessor in terms of operation, maintenance, and repair?	YES*	NO	UNK	NA	VAL
Give the nature of the difference and elaborate on the impact of the difference to the extent it is known at this time. If there is no predecessor system, select NA.					

2.0 OPERATION AND MAINTENANCE SUPPORT

2.1 Has MCCDC developed and published a Concept of Employment and/or Operations for the system?	YES	NO*	UNK	NA	VAL
Briefly describe how the system is used and deployed. How does its employment fit into the Marine Corps operational concept? Identify any areas of concern.					

2.2 Has a Maintenance & Logistics Support Concept been identified for the system?	YES	NO*	UNK	NA	VAL
Briefly describe how the system will be maintained and supported within the three levels of maintenance: operator/crew, field, and sustainment? Identify any areas of concern.					

3.0 MANPOWER AND PERSONNEL

3.1 Have the intended operator, maintainer, and support personnel been identified?	YES	NO*	UNK	NA	VAL
If YES, identify MOS or billet identification who will install, operate, maintain, and support the system to include reserves, DoD civilian, and contractor support. If applicable, identify primary user and where appropriate incidental operator.”					

3.2 Will the system or its support equipment generate any new personnel requirements such as a new MOS, skill set, or civilian billet?	YES*	NO	UNK	NA	VAL
If so, please describe the requirement(s). Personnel requirements are those human aptitudes (i.e., cognitive, physical, and sensory capabilities) knowledge, skills, abilities, and experience levels that are needed to properly perform job tasks necessary to operate, maintain, and support the system.					

3.3 Will the system require changes to manpower and/or unit structure (Table of Organization)?	YES*	NO	UNK	NA	VAL
If so, please explain. Changes may include the number (+/-) or mix (by MOS) of personnel needed or the way the unit is organized. Include expectations as to how changes will be compensated.					

3.4 Does the current acquisition and logistics manpower and personnel structure provide the right number of appropriately qualified personnel to field and manage operational support of the system as planned?	YES	NO*	UNK	NA	VAL
If not, please explain. This includes personnel assigned within the program office and the logistics supply chain. Include any expectations for changes in manpower or organizational structure.					

3.5 Has a workload analysis been completed for the operator/maintainer MOSs, or other support personnel?	YES	NO*	UNK	NA	VAL
If so, identify who conducted the analysis and briefly summarize the results. (A workload analysis can determine the manpower resources needed to achieve a capability given the required operation and maintenance activities associated with the system while taking into account existing workload factors.)					

3.6 Does another service currently operate, maintain, and train this system?	YES	NO*	UNK	NA	VAL
If yes, please identify who and to what extent if known. Identify if joint training is possible or expected, who the lead is, and whether an existing Interservice Training Review Organization (ITRO) agreement could be impacted.					

3.7 Is it anticipated that another service will operate and maintain this system?	YES*	NO	UNK	NA	VAL
If yes, please identify who and to what extent if known.					

4.0 TRAINING AND TRAINING SUPPORT

4.1 Have operator, maintainer, and support personnel Job Tasks been identified?	YES	NO*	UNK	NA	VAL
Identify whether a functional or job task analysis has been conducted. State who developed the job tasks and describe its applicability/relevance to existing training standards.					

4.2 Will mastery of operator, maintainer, and support personnel job tasks/skills be required to achieve MOS, billet, or skill designation?	YES*	NO	UNK	NA	VAL
Please explain. Note billets may include DoD civilians and contractor support personnel.					

4.3 Will current training and readiness manuals require revision to support training new or modified tasks?	YES*	NO	UNK	NA	VAL
Review current T&R Manuals before answering. If so, to what extent? Do new T&R events need to be developed?					

4.4 Will the system require New Equipment Training?	YES*	NO	UNK	NA	VAL
If yes, state intent for conduct of DT/OT, I&KPT, NET regarding basic methodology, who will develop the training, anticipated number of personnel to be trained, and method of sustainment if required. Provide a rationale for a “NO” response.					

4.5 Will the system include or require embedded training, training devices, simulators or interactive courseware?	YES*	NO	UNK	NA	VAL
If so, please describe the nature of the technology as it is understood by the program office and/or PM Training Systems?					

4.6 Is it anticipated that this system will be trained at a formal school, detachment, or other training facility?	YES	NO*	UNK	NA	VAL
If so, please identify the school/training facility, its location, rationale why it will be taught here, and the likely capacity to incorporate training into existing Programs of Instruction. If not, please state why.					

4.7 If the new system is to be trained at the formal school, detachment or training facility, will training replace current (predecessor) training?	YES*	NO*	UNK	NA	VAL
If yes, state whether the predecessor system will be retired and when. If no, will training be additive to existing POIs? Please explain. Please note a YES or NO response warrants 2 points.					

4.8 If training of this system at the formal school, detachment, or training facility will replace existing training, is there a transition plan developed?	YES	NO*	UNK	NA	VAL
If yes, briefly describe the plan to transition from the existing instruction to the new instruction. State whether the plan is documented and has been endorsed by the school/training facility. Include any projected “cross-over” requirements where both the old and new systems will need to be trained concurrently.					

4.9 Can the existing formal school, detachment or training facility infrastructure support training for the new system without facilities modification or MILCON?	YES	NO*	UNK	NA	VAL
If not, please describe the changes needed. Changes can include such things as electrical power, Internet, air conditioning, lighting, new classrooms or storage/parking areas. Provide source of information and the type of facilities required to include any MILCON requirements/plans.					

4.10 Will the system require new air/land/water space, ranges or frequencies for training exercises?	YES*	NO	UNK	NA	VAL
If yes, what is required to satisfy the requirement? If no, state whether existing space/ranges are adequate.					

4.11 Will training or use of facilities, space, ranges or frequencies require coordination with other government agencies or services that previously did not exist?	YES*	NO	UNK	NA	VAL
If yes, provide explanation to include any Interservice Training Review Organization (ITRO) impact.					

4.12 Will annual student throughput at the formal school, detachment, or training facility change?	YES*	NO	UNK	NA	VAL
If yes, state the anticipated increase if known. Is it a temporary increase? If no, state whether resource requirements will also remain unchanged.					

4.13 Will current/approved Programs of Instruction (POI) and Master Lesson Files (MLF) require review/revision or replacement to support training?	YES*	NO	UNK	NA	VAL
Recommend communication with FLC to gather input. If yes, describe the extent of the anticipate change if known (revision or replacement).					

4.14 Will incorporation of new training at the formal school, detachment, or training facility change course length?	YES*	NO	UNK	NA	VAL
Provide explanation for either “yes” or “no” answer. Is this change temporary? Include any proposed method to compensate for the change.					

4.15 Will incorporation of new training at the formal school, detachment, or training facility require changes to instructor staffing?	YES*	NO	UNK	NA	VAL
Provide explanation for either “yes” or “no” answer. Is this change temporary? Include any proposed method to compensate for the change.					

4.16 Will incorporation of new training at the formal school, detachment, or training facility change support personnel workload?	YES*	NO	UNK	NA	VAL
Provide explanation for either “yes” or “no” answer. Is this change temporary? Support billets include administrative, maintenance, supply and civilian personnel.					

4.17 Have the material resource requirements for the formal school, detachment, or training facility been identified?	YES	NO*	UNK	NA	VAL
If yes, identify the requirements or source documentation where this information is provided. This includes the actual system, ammo, tools, TMDE, fault components, consumables, etc. Has this been collaborated with the formal school?					

4.18 Is there a strategy to support unit sustainment training and/or on-the-job performance support?	YES	NO*	UNK	NA	VAL
If yes, please describe the nature of the training/support. If no, state that this is to be addressed by the MP&TA.					

4.19 Is there enough data available to complete a Logistics Requirements Funding Summary (LRFS) for MP&T?	YES	NO*	UNK	NA	VAL
If yes, please provide likely sources for the information and who will develop the LRFS. If no or UNK state to be completed with the analysis. Program offices should consult a Product Group Instructional Systems Specialist before answering.					

TOTAL POINT VALUE

To assess the risk for the program to complete a Manpower, Personnel & Training Plan without a full or partial analysis, compare the TOTAL POINT VALUE score to the ranges below:

RISK SCALES

<u>Minor Risk</u>	<u>Moderate Risk</u>	<u>Major Risk</u>
0-15 pts	16-30 pts	> 30 pts
No Analysis Required. Data to complete a MP&TP is sufficient, available and accessible.	A Partial Analysis to gather target MP&TP data is recommended.	Full Analysis Required. Data to complete the MP&TP is insufficient or non-existent.

Ultimately, the determination that an analysis is needed must be made with the consensus of the Manpower & Training Advisory Board. The decision tool attempts to present an accurate assessment of the risk from the available data but, each program will have different variables which may have an impact on the risk identified using this tool.

Place an “X” by the paragraph that reflects the Advisory Board’s recommendation:

Manpower, Personnel & Training Analysis Decision

Based on the answers to the questions above and associated risk value, the Manpower & Training Advisory Board recommends the Program Manager (PM) through the Life-Cycle Logistician:

_____ **conduct** a _____ Full or _____ Partial (*check one*) Manpower, Personnel & Training Analysis (MP&TA).

_____ **not conduct** a Manpower, Personnel & Training Analysis (MP&TA).

The Life-Cycle Logistician will prepare a memorandum for the record stating the rationale for why a Full or Partial MP&TA is or is not needed. When a Partial MP&TA is required, the memorandum will specify the areas on which the analysis will focus. A copy of this document, signed by the Advisory Board members, will be attached to the memorandum.

Manpower, Personnel & Training Plan Decision

_____ In almost all cases a MP&TP is required. However, based on the urgency of the requirement, the answers to the above questions, and the associated risk value, the Manpower & Training Advisory Board has determined that the (*Insert Product/Program Title*) **does NOT** require a Manpower, Personnel & Training Plan for the reasons explained below. **This decision does not negate the requirement to properly plan for New Equipment Training or address MP&T in the appropriate program documentation.** The Life-Cycle Logistician will include this decision in the memorandum for the record stating the rationale why a MP&TP is not required. The program office will re-evaluate this decision should the program’s acquisition and logistics support strategy change.

Rationale for not conducting an MP&TA or developing a MP&TP:

While an MP&TA and MP&TP may not be required, it is recommended you document any areas of risk or get well plans here.

Advisory Board Recommendation & Signature Page

Insert Product/Program Title

MP&TA Required		MP&TP Not Required	
MP&TA Not Required		Date:	

Place an “X” in the spaces that apply.

PROGRAM LIFE-CYCLE LOGISITICIAN	Print Name:
	E-Mail:
INSTRUCTIONAL SYSTEMS SPECIALIST*	Print Name:
	E-Mail:
TECOM	Print Name:
	E-Mail:
TFSD	Print Name:
	E-Mail:
OPERATOR OCCFLD SPONSOR	Print Name:
	E-Mail:
MAINTAINER OCCFLD SPONSOR	Print Name:
	E-Mail:
CAPABILITIES DEVELOPMENT OFFICER	Print Name:
	E-Mail:
PM TRASYS	Print Name:
	E-Mail:
OTHER	Print Name:
	E-Mail:
OTHER	Print Name:
	E-Mail:

Signatures of M&T Advisory Board Members (required)

* Programs that do not have Product Group Instructional Systems Specialist (ISS) support should request the AC LCL MP&T Lead or another Product Group ISS attend the Advisory Board meeting.

c. Officer accession and enlisted grade distribution

Office Grade Distribution		
Rank	Number	Percent
WO1	195	1.02%
CW02	805	4.23%
CW03	531	2.79%
CW04	271	1.42%
CW05	81	0.43%
2ndLt	2641	13.88%
1stLt	3001	15.77%
Capt	5358	28.16%
Maj	3546	18.64%
LtCol	1814	9.53%
Col	699	3.67%
Gen	83	0.44%
	19025	100.00%

Reserve Officers		
AGE	Number	Percent
20	0	0.00%
21	0	0.00%
22	0	0.00%
23	3	0.09%
24	5	0.15%
25	7	0.21%
26	8	0.25%
27	13	0.40%
28	19	0.58%
29	35	1.07%
30	34	1.04%
31-35	468	14.33%
36-40	956	29.28%
41+	1717	52.59%
	3265	100.00%

Enlisted		
AGE	Number	Percent
17	425	0.26%
18	9272	5.75%
19	16533	10.24%
20	20527	12.72%
21	22130	13.71%
22	18090	11.21%
23	12780	7.92%
24	9438	5.85%
25	7705	4.77%
26-30	22923	14.20%
31-35	11386	7.05%
36-40	6738	4.17%
41+	3445	2.13%
	161392	100.00%

Reserved Enlisted		
AGE	Number	Percent
17	0	0.00%
18	81	0.22%
19	1522	4.20%
20	2825	7.80%
21	3660	10.10%
22	4005	11.06%
23	4079	11.26%
24	4166	11.50%
25	3509	9.69%
26-30	7281	20.10%
31-35	2474	6.83%
36-40	1516	4.19%
41+	1102	3.04%
	36220	100.00%

C. PEDAGOGY VS. ANDRAGOGY¹¹²

Pedagogy vs. Andragogy

	Pedagogical	Andragogical
The Learner	• The learner is dependent upon the instructor for all learning • The teacher/instructor assumes full responsibility for what is taught and how it is learned • The teacher/instructor evaluates learning	• The learner is self-directed • The learner is responsible for his/her own learning • Self-evaluation is characteristic of this approach
Role of the Learner's Experience	• The learner comes to the activity with little experience that could be tapped as a resource for learning • The experience of the instructor is most influential	• The learner brings a greater volume and quality of experience • Adults are a rich resource for one another • Different experiences assure diversity in groups of adults • Experience becomes the source of self-identify
Readiness to Learn	• Students are told what they have to learn in order to advance to the next level of mastery	• Any change is likely to trigger a readiness to learn • The need to know in order to perform more effectively in some aspect of one's life is important • Ability to assess gaps between where one is now and where one wants and needs to be
Orientation to Learning	• Learning is a process of acquiring prescribed subject matter • Content units are sequenced according to the logic of the subject matter	• Learners want to perform a task, solve a problem, live in a more satisfying way • Learning must have relevance to real-life tasks • Learning is organized around life/work situations rather than subject matter units
Motivation for Learning	• Primarily motivated by external pressures, competition for grades, and the consequences of failure	• Internal motivators: self-esteem, recognition, better quality of life, self-confidence, self-actualization

¹¹² Taken from <http://www.floridatechnet.org/in-service/abe/abestudent/andravsped.pdf> (accessed November 15, 2008).

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Natick, Massachusetts
6. John A. Anthony (SgtMaj, retired)
Jacksonville, North Carolina