

Ender's Game Redux

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My brother, a US Army surgeon in Iraq, sent me an e-mail message not long ago in which he concisely summarized the convergence of entertainment technology and military training to create what Ben Sawyer, a high-tech freelance writer and technology consultant, has dubbed *serious games*. My brother wrote the following:

Our medics are taking care of fresh casualties every day. That is why I think it would be great to have the sim out here because:

- We are fairly well restricted to the compound as we are surrounded by the enemy.
- Soldiers have not much else to do during their "down time."
- They have real-life experiences they can compare the sims to.
- They love computer games.

This situation shows that we live now in a complex world that changes dramatically from day to day. Game technology, now ubiquitous in places like Camp Falluja, Iraq, offers a path to sharing and realizing interactive experiences that mirror reality.

To capitalize on this opportunity, the military is developing several simulations that help soldiers train for waging war, keeping the peace, and recovering from the emotional trauma that combat can cause.



The US military's new training simulations prepare soldiers for war, peace, and everything in between.

ENTERTAINMENT AND TRAINING

If necessity is the mother of invention, war is often the midwife.

Consider the rapid development of radio in World War I and radar and computing in World War II. The symbiosis between military training and entertainment technology follows a similar pattern. The first flight simulator used by the Navy, the *Link Blue Box*, sold originally to the Coney Island amusement park while the Navy awaited funding in the 1930s.

This legacy lives on in simulators, with the technology going both ways. For example, Disney's *Mission to Mars* ride at Walt Disney World's EPCOT Center provides a technologically complex simulation of space flight that relies on advanced simulation technology from the military aerospace industry.

Stanford University's Timothy Lenoir has documented in detail this long-standing relationship between the military and entertainment (www.stanford.edu/dept/HPST/TimLenoir/Publications/Lenoir_TheatresOfWar.pdf).

21ST-CENTURY WAR

War in the 21st century brings new military training challenges.

Long before the invasion of Iraq and the South Asian tsunami, US Marine General Charles Krulak wrote a seminal article in 1999 about the dilemmas facing modern soldiers. In "The Strategic Corporal: Leadership in the Three-Block War" (www.au.af.mil/au/awc/awcgate/usmc/strategic_corporal.htm), Krulak described the need for soldiers who can fight conventional combat in one city neighborhood, transition to peacekeeping operations in another,

then provide humanitarian relief in a third.

Moreover, every decision a soldier makes, from private to general, has become strategically relevant. Thus, Krulak wrote that "The inescapable lesson of Somalia and of other recent operations, whether humanitarian assistance, peacekeeping, or traditional warfighting, is that their outcome may hinge on decisions made by small unit leaders, and by actions taken at the lowest level."

Krulak offers the following prescription for training US soldiers: "The common thread uniting all training activities is an emphasis on the growth of integrity, courage, initiative, decisiveness, mental agility, and personal accountability."

Crisis simulation

One approach the US Army has taken to training for the three-block war involves actually building the blocks in highly instrumented urban war training facilities such as Fort Polk's Joint Readiness Training Center in Louisiana, with actors who role-play civilians and terrorists. The experience at JRTC resembles a theme park: Soldiers arrive at some mythical



Figure 1. Full Spectrum Leader. This military simulation puts the player in charge of an entire US Army platoon, which must be successfully guided through challenging combat missions.

main street in a distant land, except they're there not for amusement but serious business.

Much like Bill Murray in *Ground Hog Day*, soldiers at these facilities undergo discovery learning. The seriousness comes across in the After Action Review. An often brutally candid self-examination of what each individual did right and wrong, the AAR is facilitated by experienced observers armed with video and data that document every mistake participants made during the exercise.

The army also applies the AAR to simulators such as the Engagement Skills Trainer 2000—a marksmanship system that employs both synthetic 3D graphics and filmed scenarios to teach troops sound judgment in the use of force.

The Israeli experience with their version of the EST 2000 provides a good example of how this process works. The Israeli Defense Force's Lieutenant Colonel Golan, an engineer and enthusiastic computer gamer, believes that units stationed in confrontation zones can use the mobile range to continue

to train and maintain their skills. Golan believes that the state-of-the-art simulator can help the IDF do far more than improve its soldiers' shooting skills during a time when its ethical image is being eroded in its own eyes by one horrific incident after another.

Golan noted that every real event is analyzed and the observers' conclusions drawn up. The officers then decide what lessons can be learned from the incident and work with military personnel experienced in film production to create a video that conveys this information (www.haaretz.com/hasen/spages/522671.html).

Gaming warfare

Unfortunately, combat units rarely get to attend training at instrumented facilities like the JRTC more than once a year. Further, large virtual simulators such as EST 2000 cost significantly more than consumer devices. Thus, during the 1990s, the military began exploring the use of PCs and video game consoles as affordable alternatives to their big simulators.

In 1999, the US Army established the

University of Southern California's Institute for Creative Technologies to foster new training and simulation research that would address Krulak's Strategic Corporal challenge. The institute exploits entertainment technologies that could enable better methods for developing leadership and decision making.

Game technologies became the leading candidate for research because they provide increasingly sophisticated interactive experiences that can be networked via the Internet (www.ict.usc.edu/disp.php?bd=proj_games). This work spurred a flowering of developments in using game technology for training (www.dodgamecommunity.com).

James Korris, creative director of ICT, and Pandemic Studios developed perhaps the best-known product of this type, *Full Spectrum Warrior*, for the Xbox and PC. FSW employs advanced artificial intelligence and user interface techniques that let a player experience the role of a squad leader in urban combat.

The game replaces the typically fast-paced first-person shooter design with a more deliberate, 3D real-time strategy game. As the squad leader, you can't even shoot your weapon—your job is to maneuver your squad through hostile territory without losing members of your team. The version developed by the military so impressed commercial publishers that THQ released it commercially in 2004.

The commercial version differs significantly from the military one, however. The Army version received a thorough review for realism by subject-matter experts. Given that it accurately models the challenges of urban combat, it is harder to “win” in this version.

First-person thinker

ICT is now at work on the new game shown in Figure 1, *Full Spectrum Leader*, in which you role-play an infantry platoon leader. This makes your job more complex—you must

lead 30 soldiers instead of eight—and the missions available are more diverse.

FSL will include AI advancements such as an opponent's ability to recognize players' actions and respond dynamically. Designed to develop cognitive skills, *FSL* requires tactical decision making, resource management, and adaptive thinking. Its scenarios focus on asymmetric threats within peacekeeping and peace-enforcement operations.

ICT's Mike van Lent leads the effort to put *explainable AI* into these simulations. This will give the AI entities—enemies, civilians, and friendly troops—the ability to explain the rationale for their behavior. This, in turn, will enable the games to provide more relevant AARs.

Given the cerebral nature of the challenges facing players, *FSL* may well be the first of its kind: a first-person *thinker* that takes the fast-paced checkers experience of a first-person shooter and turns it into a strategic speed-chess match.

Simulation therapy

Some ICT researchers have proposed using game technology to treat soldiers suffering from post-traumatic stress disorder.

Skip Rizzo and Jarrell Pair are extending the research Pair did with Larry Hodges at Georgia Tech by using *FSW* to treat PTSD. Their version of *FSW* employs an interface that provides the clinician with the capacity to monitor a patient's behavior and customize the therapy experience by placing individuals in virtual-environment locations that resemble the setting in which the traumatic events occurred initially.

To foster the anxiety modulation needed for therapeutic habituation, the interface also facilitates the gradual introduction and control of trigger stimuli in the environment, in real time.

Military psychologists in Iraq support Rizzo and Pair's research. Soldiers and marines there already play a host of games during their down time.

Psychologists who treat combat stress recommend video games for marines to unwind and boost morale.

Erin Simmons, a lieutenant and psychologist with Bravo Surgical Company, noted that tastes in games vary widely: Some soldiers like games with aggressive military content, while others prefer games that provide an experience as different from the war zone as possible. However, the troops find the games relaxing regardless of their preferred genre (<http://msnbc.msn.com/id/6780587>).

Digital linguistics

The US military faces a major challenge in providing language and cultural-awareness training to the 150,000 soldiers in Iraq. Thus, another game getting attention within the military is the DARPA-sponsored DARWARS Tactical Language Training System.

Lewis Johnson and Stacy Marcellis at USC's Information Sciences Institute lead the project, which aims to overcome the bottleneck of classroom training.

Language training in the military often involves months of classroom instruction and is limited to intelligence specialists. DARWARS, based on a modification of the commercial game *Unreal Tournament*, provides interactive language learning through speech recognition.

Players initially practice on vocabulary items and learn gestures, then apply them in simulated missions. In the simulation, they interact with virtual characters in a variety of scenarios that introduce the player to Arabic culture and language (www.isi.edu/isd/carte/proj_tactlang).

Massively multiplayer classroom

The Army's Simulation Technology Center is working with Forterra to develop a massively multiplayer online role-playing game for training soldiers throughout the world. Based on the same technology used for the massively multiplayer online game *There* (www.there.com), the Asymmetric Warfare

Environment project is being designed along the lines of games such as *Everquest*, in which thousands of role-players interact in the same 3D-persistent world over the Internet.

Forterra president Robert Gehorsam explains that AWE will let a commander tailor his unit's training to a specific environment and scenario or modify an existing one out of a repository. The relevant training exercises can last anywhere from a couple of days to months, and all of the action will take place online (www.homelanfed.com/index.php?id=20830).

The AWE environment now includes a Baghdad database and has been used to develop checkpoint training scenarios for distributed teams in the US National Guard and the active US Army.

In Orson Scott Card's visionary 1986 science fiction novel, *Ender's Game*, the hero, Andrew "Ender" Wiggin, is drafted into Battle School. Although only a child, Ender tackles increasingly difficult simulator missions against an alien race. After he wins the brutally difficult final scenario, Ender realizes that the simulated battle he has just fought was no sim, but the real conflict's ultimate conclusion. Thus did Card envision the emergence of simulations and games for training and the power of the Internet to influence ideas and change.

Ender Wiggin's bizarre world is no longer fiction. The military is already using the simulation technology of first-person thinkers to help soldiers learn how to fight the three-block war, learn the language of allies and adversaries, heal mental scars, and even save the lives of others. ■

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