The use of general computer-aided simulations as well as fully immersive simulations has been greatly explored and utilized by the U.S. Army. It is through this extensive use that the military has been able to note the potential problem of negative learning. Various reviews and research reports continually look at the Army’s use of simulations and negative learning effects (example: *Distributed Interactive Simulation of Combat*, September 1995, *A Training Technology Evaluation Tool*, 2005). The Army constantly reviews its training and simulations so as to find ways to modify and improve. A key component, which the Army is starting to fully realize, is that it isn’t just a matter of making a “perfect” simulation, it is also a matter of using it correctly and with the right guidance/manager or subject matter expert (SME). “…where games [simulation] are inadequately used, selected without clear criteria or incorrectly embedded into practice there are indications that this may lead to negative learning experiences,” (Freitas, 2007).

As a Sergeant First Class (SFC), with over 15 years of experience in the U.S. Army, I have personally experienced and witnessed several occasions where the use of an SME helped mitigate negative learning as well as where the lack of proper guidance caused negative learning to occur. This military based information is valuable in that many of its aspects and lessons learned can be applied to other domains.

One scenario that occurred roughly three years ago, involves the use of a fully immersive simulation. Several other soldiers and I were being trained on how to best conduct a security patrol within a vehicular convoy. We had real steering wheels, real (mock) mounted weapons and wore helmets that had built-in 360 degree monitors to give us a fully immersive environment. The training consisted of driving along a simulated road in a virtual Iraq that had several overpass bridges that we would drive under. We were directed to watch out for IEDs (Improvised Explosive Devices) and enemy combatants near bridges.
Our SME/trainer began the scenario but was then called away and so a technical assistant continued on with the scenario. Within about 30 minutes we had gone through the scenario several times and were congratulating ourselves on how well we had done. At that moment the subject matter expert (SME) came in, quickly reviewed what we had done during the scenario and said we were going to do it again. Just before we began again the SME went to the gunners and moved them to the other side of room and had them sit down. In a loud voice he told the rest of the class that these soldier were now in Fort Leavenworth (Army prison), because in the previous scenario they had “accidently” killed three civilians. Each one of the civilian deaths could have been avoided and occurred because we were too focused on completing the mission and eliminating all enemy combatants. If the SME had been with us throughout the scenario he could have directed us to be more precise and selective. Initially at the end of our training, we had learned to simply destroy any enemy combatant and the surrounding area (negative learning). It was correct within the scenario and allowed us to succeed in the mission, but as we learned from the SME trainer, we failed in that we killed innocent bystanders which would cause second and third order effects that would be detrimental both militarily and politically.

In another example, while training for a deployment to Kosovo, my squad was being trained on Tactical Operations Center (TOC) procedures. We used computer simulations to practice various scenarios and how to react to them. One scenario learned dealt with riot control. Through the training we learned to interpret various sources of intelligence, send additional patrols to monitor and to notify local authorities and assist if absolutely needed. In training this was straightforward and all was learned efficiently and actions taken occurred quickly. Once we arrived “in country” and started to actually do these operations in “real life,” I noticed that everything occurred much slower and was not as efficient. In reviewing and comparing the simulation to real life the big difference was the human interaction element. The Kosovo mission is a multinational endeavor that requires the U.S. military to work together with militaries from many other nations.

The computer simulations did not take the interactions with other militaries fully into account. Cultural difference, language barriers and emotions were beyond the scope of the simulations. The other militaries where there in Kosovo to assist us (U.S. military), not to simply take orders from us. I instructed my soldiers, and I as well, began to develop a more personal relationship with the soldiers from the other militaries. Actions to take during operations where still given, but orders were dispatched in a more
diplomatic and friendly way. This resulted in dramatic increases in efficiency and time to complete missions. Negative learning occurred because of the limits of the simulation. Since the importance of the interaction variable was not addressed in the simulation, neither my soldiers nor I noted it as important. Additional guidance during the simulation would have greatly improved the overall learning effect. This lesson learned has been addressed by the Army and is now being used in their training as well as within briefings of follow-on forces.

Simulations as training tools are a huge asset to training and education in general, but the possibility of negative learning will always exist. SMEs and clear guidance should always be utilized to achieve maximum results with any simulation. The more immersive the simulation the more accountable the user should be so as to see the full extent for all actions (second, third order effects). To further illustrate this point the U.S. Army has a game/simulation publicly available called “America’s Army.” It used to be that you couldn’t shoot another U.S. soldier within the game (the simulation simply wouldn’t register it), which of course could directly lead to negative learning (Sanchez et al., 2007). Current versions of the game now register fratricide hits and according to the game’s Frequently Asked Questions section “…players who engage in fratricide or who violate their rules of engagement incur significant penalty points. At a certain threshold, these penalty points result in a player being removed from game play to a virtual version of the Army Disciplinary Barracks at Fort Leavenworth (www.americasarmy.com).” Negative learning can be mitigated but it takes diligence, accountability, observation and constant review in comparing “real life” to the simulated environment(s).