

Research Requirement:

Automated Intelligent Training with a Tactical Decision Making Serious Game

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Executive Summary

This report describes a game-based training capability developed to support self-directed training in small unit leader tactics. The Intelligent Game-Based Evaluation and Review (InGEAR) capability combines two technologies: (i) "Follow Me," a small unit leader tactical training game used by instructors and cadets at the United States Military Academy at West Point, and (ii) an intelligent tutoring system (ITS) for automated delivery of tailored evaluation and feedback in scenario-based exercises. InGEAR's objective is to combine game-based training capabilities with learner-centric scenario editing, performance assessment, and feedback to enhance learning and simplify instructors' taskload. These capabilities provide instructors with viable options for dealing with time constraints that limit the opportunities most cadets have for direct feedback on their own decisions and performance.

Procedure:

InGEAR was developed in several iterations over the course of a year, starting with collaboration with end users to define requirements, and then moving through three software development spirals with intermediate demonstrations and opportunities for feedback. The primary result of the requirements process was to define a target set of evaluation measures used as a catalog for the remainder of development. The three development spirals focused on asynchronous assessment and feedback, followed by real-time assessment, and finally scenario authoring tools. The fully operational capability was transitioned, with appropriate support materials, after the third spiral review with end users.

Findings:

According to U.S. Military Academy (USMA) instructor and simulation center feedback during the software spiral demonstrations, InGEAR supports a student-centered learning experience within tactical leadership classes and increases an instructor's ability to tailor tactical scenarios and performance measures to specific training needs. Additionally, by providing a capability to automate tailored assessments and guidance as students work through various scenarios, InGEAR also expands the ability of instructors to identify learning trends and assess individual and class progress. In summary, InGEAR represents a practical application of game technology for a real-world training use.

Utilization and Dissemination of Findings:

The *Follow Me InGEAR* capability has been delivered to end users at the West Point Simulation Center, USMA, where instructional staff has expressed their intention to immediately

begin employing it to support tactical leadership training. In addition to the software deliverables, the authors of this report also published a conference paper discussing approaches for generalization and reuse, in terms of specific observations derived from InGEAR development. Many of the tactical principles assessed in InGEAR are common to other domains and training environments. Because InGEAR is designed to support scenario authorability, it represents an initial step toward an abstracted assessment model for measures that can be easily applied in different scenarios. The benefit of such an abstracted assessment model is its potential to reduce development time and cost for situated tutors with a variety of virtual environments. Additionally, because *Follow Me* shares a common engine with Decisive-Point's *Crucible of Command*, which is currently in use in other training settings, there are opportunities to port InGEAR's assessment capabilities to other platforms.