Critical Thinking Training: Proven New Technologies for Engaging DoD Personnel

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ABSTRACT

Critical thinking is widely accepted as a requisite skill for successful military leaders. Today's DoD leaders must thwart sudden assaults with preemptive parries and innovative defensive tactics. This requires a level of critical thinking and meta-cognition that has not been widespread in the past and is not always found in educational processes today. Effectively enhancing that skill set via a range of training techniques has a well-documented history, but the application of those techniques remains uneven and irregularly available. The authors' past and current research is in the use of conversational on-line avatars in a number of contexts and in the use of distributed computing and simulation. These capabilities tender a solution to global application and continuing availability of critical thinking training for DoD personnel. A short review is offered of the need for and the negative impacts of the lack of critical thinking. Then this paper discusses both the distributed computing simulation capabilities that have been demonstrated and the emerging technologies required for delivering engaging conversational avatars, capable of carrying on a life-like verbal exchange with the users. Examples of where and how both the distributed computing and avatar interface have proven effective are given, with analysis about the impact these capabilities would have on critical thinking training. A brief survey of effective critical thinking pedagogies is followed by an analysis of which would be most effectively adapted to the distributed computing avatar environment. A discussion is presented concerning the relative benefits of using animated avatars vice using "live" video clips as the response vehicle for the conversation. The efficacy of using an active voice recognition-enabled dialogue instead of a text delivered didactic approach is given. The paper closes with a description of how such a system could effectively serve the globally-dispersed and time-constrained DoD personnel.

ABOUT THE AUTHORS

Dan M. Davis is a consultant for the Institute for Creative Technologies, University of Southern California, focusing on large-scale distributed DoD simulations. He was the Director of the JESPP project at JFCOM for a decade. As the Assistant Director of the Center for Advanced Computing Research at Caltech, he managed Synthetic Forces Express, bringing HPC to DoD simulations. Prior experience includes serving as a Director at the Maui High Performance Computing Center and as a Software Engineer at the Jet Propulsion Laboratory and Martin Marietta. He has served as the Chairman of the Coalition of Academic Supercomputing Centers and has taught at the undergraduate and graduate levels. As early as 1971, Dan was writing programs in FORTRAN on one of Seymour Cray's CDC 6500's. He saw duty in Vietnam as a USMC Cryptologist and retired as a Commander, Cryptologic Specialty, U.S.N.R. He received B.A. and J.D. degrees from the University of Colorado in Boulder.

NICHOLAS KAIMAKIS is active in research at the Institute for Creative Technologies of the University of Southern California. His current research thrusts are in the use of computer generated avatars or video clips, animated and directed by natural language optimized Artificial Intelligence (A/I) programs that present a life-like dialogue capability to interact with remote users via the internet. He has demonstrable success designing efficient project structures, teaching programming, and managing multi-faceted teams. His current project is funded by the Navy and is designed to help improve knowledge of STEM fields across varied demographics with the development of an interactive interface that makes STEM information more accessible on-line. He is an undergraduate student studying Computer Science within the Viterbi School of Engineering at the University of Southern California.