

Critical Thinking Training: Proven New Technologies for Engaging DoD Personnel

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ABSTRACT

Critical thinking is widely accepted as a skill needed by successful military leaders. A high level of critical thinking and metacognition is required, but the authors have not often observed this in educational processes today. Effectively enhancing that skill set via various training techniques is well documented, but the application of those techniques remains problematical. The authors' past and current research is in the use of conversational on-line avatars and in the use of distributed computing and simulation. These capabilities are useful in addressing problems in critical thinking training and providing global accessibility and continuous availability. A short review is offered of the need for critical thinking. A brief survey of effective critical thinking pedagogies is followed by an analysis of which would be most effectively adapted to the distributed computer-generated avatar environment. This paper then discusses the distributed computing simulation capabilities that have been demonstrated and the emerging technologies enabling the delivery of engaging conversational avatars. These avatars are capable of carrying on life-like verbal exchanges with the users. Examples of where and how both the distributed computing and avatar interfaces have proven effective are given. A discussion is presented concerning the relative benefits of using animated avatars vice using video clips of "live" personnel as the response vehicle. The benefits of using an active, voice recognition dialogue instead of a text delivered FAQ approach is given. The paper closes with 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 University of Southern California, focusing on large-scale distributed DoD simulations. Pre-retirement, for a decade he was the Director of USC's JESPP project for JFCOM. 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 (CS) within the Viterbi School of Engineering at the University of Southern California.

Howard Spaulding is a retired Cryptologic Technician (Interpretive) Senior Chief Petty Officer and recently retired from Schneider National where his duties focused on training. His military service spanned three decades including 28 months in Viet Nam as a Marine Cryptologic Linguist. His Naval service included tours in the Philippines, Thailand and Japan. He also served as the Assistant Officer in Charge during the development of a highly technical project under the supervision of CNSG and SPAWAR and was instrumental in the interior design of the ES-3A Aircraft. He made two deployments aboard an Allied Naval vessel as the lone area/target expert. He has been at the forefront of career path decisions of other personnel in both the military and civilian sectors. He received a BA from California State University, Long Beach in 1983 while still on active duty.