Aptitude for Command Evaluations: Implementation Opportunities for Cognitive Science

Jennifer H. Nolan, John J. Tran & Dan M. Davis
Catholic Polytechnic University
Los Angeles, California
{jnolan, jtran & ddavis}@catholicpolytechnic.org

ABSTRACT

The aptitude for command is an invaluable characteristic that is most apparent in combat situations, where any failures to elicit appropriate responses from subordinates can result in personnel losses, mission failures and societal catastrophes, including annihilation and even genocidal eradication. Attempts to identify, instruct and inculcate these qualities have long been associated with subjective, almost mystical approaches, more founded in emotion and bias than in scientific inquiry. Emerging techniques, technologies and analyses now hold the promise of making these ethereal qualities more quantifiable and objective, including DNA analysis. This paper lays out the past attempts at ascertaining those qualities seen to be effective in combat, the methods of enhancing these, and the evaluative instruments that have far too often failed to identify the needed leadership. Poor selections were costly to those being led, the putative leader, and those depending on them for defense. Now, emerging technologies are enabling the Cognitive Scientists to identify certain physically measurable and quantitatively definable parameters, both their presence and their correlations with various behavioral qualities. These qualities are indicative of desired characteristics to be sought or, in the alternative, undesirable characteristics to be avoided. Supportive work will be offered in the form of a survey of on-going and related efforts by others in these fields. Analogous research and experience by the authors will be adduced to show this emerging capability merits consideration. Most especially, the paper lays out how to assist those saddled with the duty of ensuring only the most capable are assigned to critical operational posts. In reaching this result, the paper reviews some adjuncts to Cognitive Science: the disciplines of computer science, artificial intelligence, sensor technology, and analytic techniques. These may be brought to bear in a multi-disciplinary manner to the benefit of the warfighters.

ABOUT THE AUTHORS

Jennifer H. Nolan, PhD, is the President of Catholic Polytechnic University and Professor of Psychology in their College of Arts and Sciences. Her earlier work specialized in memory, dementias, stroke and insulin resistance. She is a brain plasticity specialist and certified Cogmed provider. Previously, she was the C.O.O. and co-founder of a stroke and brain injury rehabilitation center. Dr. Nolan has taught university courses at UC Irvine, Loyola Marymount University, and Glendale Community College. She has conducted local and nationwide clinical trials, and published in both scientific journals and popular magazines. She received a BA in Psychology from Loyola Marymount and a Ph.D. in Psychology from the Dept. of Cognitive Science at the University of California, Irvine.

John J. Tran, PhD is the Chairman of the Computer Science Department of the Catholic Polytechnic University and he retired as a Lieutenant Colonel in the California Air National Guard. He has worked at ISI, USC, the Stanford Linear Accelerator Center, Safetopia, and Intel Corporation. At USC, he focused on Object-oriented software engineering, large-scale software sys-tem design and implementation, and high performance parallel and scientific computing. Air Force tours included the White House Communications Agency and Kirkuk Regional Air Base (Iraq), where he was the Communications Squadron Commander. He received both his BS and MS Degrees in Computer Science and Engineering from the University of Notre Dame and was awarded his PhD in Computer Sciences at the University of Southern California, where he was an advisee of Dr. Robert F. Lucas. His doctoral dissertation on quantum computing was entitled: Optimization of the Combinatoric Closely Spaced Objects Resolution Algorithm with Adiabatic Quantum Annealing

Dan M. Davis, CDR. USN, Ret. is a Research Associate Professor at Catholic Polytechnic University and a consultant at the Institute for Creative Technologies, University of Southern California (USC), focusing on large-scale DoD simulations and avatar uses. Prior to retirement, he was the Director of the JESPP project at USC for a

decade. As the Assistant Director of Advanced Computing Research at Caltech, he ran Synthetic Forces Express, bringing HPC to DoD simulations. He also served as a Director at the Maui High Performance Computing Center and in computer research roles at the Jet Propulsion Laboratory and Martin Marietta. He was 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. While in the Marine Corps, he saw duty in Vietnam as a Cryptologist and retired in 2002 as a Commander, U.S.N. He received B.A. and J.D. degrees from the University of Colorado in Boulder.