Evaluating Manifest Narrative Skills: Assessment via New Technologies and Parameters

Dan M. Davis, Marianne M. Garman & Jennifer H. Nolan
Catholic Polytechnic University
Pasadena, California
{ddavis, mgarman, jnolan} @catholicpolytechnic.org

Mark C. Davis
Wood Duck Research, Inc.
Mooresville, NC
davismc@ieee.org

ABSTRACT

This paper reviews the need of and opportunities for improving the selection of new employees in the Science, Technology, Engineering and Mathematics disciplines. These evaluative processes encompass preliminary screenings, basic skill evaluations, potential professional enhancement and alternative placement options. The current, often hand administered, pre-employment evaluations are sometimes prone assessing the incorrect parameters or are devoid of emerging, but hitherto unrecognized technologies. With increased campus emphasis on STEM courses, the paper surveys industrial, academic and government hiring reports of poor communications skills and insufficient critical thinking and metacognitive ability in new hires, including narrative skills. They report on their study of the inability of most candidates to either articulate current or envision future work activities. Then the various parties with a vested interest in improving this situation are enumerated and their needs identified. The later sections of the paper are devoted to an explication of the thesis that many of these shortcomings can more effectively, more efficiently and more economically be addressed by technologies and techniques that are either extant or emerging. The abilities to generate, assess, implement and evaluate various new parameters are set forth and anecdotal and statistical evidence is adduced to support further consideration and adoption of these techniques. Some of these are Natural Language Processing, virtual conversational computer agent interfaces, Deep Learning, Quantum Annealing, and Learning Analytics. Both career experience and on-going research are cited as foundations for the paper's theses. However, significant progress is rarely devoid of risks, so the paper devotes a section to identifying the risks anticipated, the severity of their occurrence and ways to avoid or mitigate future damage. The paper closes with conclusions and the vision for paths forward for the Modeling and Simulation community, as well as the potential extensibility of these approaches into other disciplines, projects or professional environments.

ABOUT THE AUTHORS

Dan M. Davis is a Research Associate Professor at Catholic Polytechnic University and is active as 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.

Marianne M. Garman was appointed as a Staff Researcher in June of 2022 at Catholic Polytechnic University in their College of Arts and Sciences. Her earlier work began at the Control Data Corporation. In the 1960's, she taught at Thammasat University in Bangkok Thailand. Marianne has extensive experience in Human Resources, especially in the evaluation of personnel new acquisitions and placement. Her research interests are in the expansion and quantification of new parameters for predicting performance, as they may be enabled by the emerging computational and simulations sciences. In addition, she was active in land acquisition and site development. She is also committed as a volunteer for Women Giving Back, a nonprofit organization, and she participates as a docent and tour guide at

The Kennedy Center in Washington, District of Columbia. Marianne is an alumna of the University of Colorado, Boulder, Colorado.

Jennifer H. Nolan 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 the University of California 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 University, Los Angeles and a Ph.D. in Psychology from the Dept. of Cognitive Science at the University of California, Irvine.

Mark C. Davis is the Chief Technical Officer at Wood Duck Research, Inc, and is semi retired after careers in the US Navy and as a computer design engineer for both IBM and Lenovo. Rising to the level of Distinguished Engineer at Lenovo, he was responsible for the design of laptop computer cross-disciplinary technology, including PC architecture, embedded systems, open source and virtualization. Previous work was with IBM in the areas of software development and architecture involving security, storage and virtualization. Dr. Davis has been granted well over fifty patents that were filed during his service at both companies. He is a graduate of the Duke University NROTC program and was commissioned as an Ensign, attended nuclear power school, and served as a Submarine Officer for twelve years, including one duty tour as a classroom instructor. He left the active duty as a Lieutenant Commander to pursue a PhD. Mark holds a BSEE degree from Duke University and a PhD in Computer Science from the University of North Carolina, Chapel Hill, where his advisor was Professor Fredrick P. Books.