Advanced Pedagogies for Defense Professional Writing: Implementing Metacognition and Constructivism

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ABSTRACT

Cogent and compelling professional writing is fundamental to maintaining national economic strength and defense ascendency. Considered first is the current need for and prospective deleterious effect of the lack of effective writing. Anyone who had been on a peer-review committee can relate to the current lack of writing proficiencies in the Science, Technology, Engineering and Math communities and anyone who has attended a professional conference can attest to the lack of presentation skills. Rather than spend too much time on decrying the current problems, the authors offer their experience in mentoring young researchers. They particularly advance two approaches which they have found both are wanting in standard approaches and effective in a mentor/mentee relationship: Metacognition and Constructivism. The origins of Metacognition are traced to John Flavell and the approach is analyzed for efficacy and ease of implementation. Then, Constructivist approaches are explicated and evaluated. The authors see implementation as the major impediment to effective utilization of those two techniques. The authors then adduce some data to reinforce their positions in these matters. The paper then turns to the actual experience in the authors' mentoring activities and the results from it. As a more universally applicable implementation strategy, the paper reviews recent advances in virtual humans, Natural Language Processing, virtual conversations and computational asset advances that further enable and support a computer aided education approach. Preliminary data is adduced concerning all of these aspects of the effort. The materials are presented in a way that should enable other institutions to more effectively implement programs of their own. The paper lists on-line and open-source assets that would aid the users in creating their own program to enhance the writing skills of personnel in their organizations. They conclude with analyses of the likelihood of success of such efforts.

ABOUT THE AUTHORS

Milton D. Rosenberg is a Special Projects Manger at the University of Southern California's Institute for Creative Technologies. He is a Project Manager supporting ideation, design, budgeting, scheduling, staffing, developing, delivering, documenting, and reporting on research projects and prototype software implementations for training. He has been the principal interface with many federal entities including: Department of Homeland Security, U.S. Army, Defense Advanced Research Projects Administration (DARPA), National Institute of Health (NIH), and private corporations. He has focused on implementing business processes and supporting software tools for production testing, release processes, project management, and effort planning. Milt has co-authored 7 jury-accepted research papers. Mr. Rosenberg has a B.A. degree from Pennsylvania State University.

Frederica J. Stassi. Ed.D. is a Science Education Analyst, working in the Central Coast of California. Her background includes research for the National Science Foundation in which she was funded to study pedagogies and efficacy in U.S. Science museums. This research involved museums from the East Coast to Oʻahu in Hawaiʻi. Her doctoral research was conducted under the guidance of Professor William McComas and focused on the development of science standards for the State of California. She received a BA degree from Tabor college, as well as an M.A. Degree in music performance and an Ed.D., both from the University of Southern California.

Dan M. Davis, J.D. 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 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. He saw duty in Vietnam as a USMC Cryptologist and retired as a Commander, U.S.N. He received B.A. and J.D. degrees from the University of Colorado in Boulder.