Innovative Education Technologies: Optimizing Future Information Comprehension Capabilities

Dan M. Davis
University of Southern
Los Angeles, California
dmdavis@acm.org

Frederica J. Stassi
Science Education Analyst
Lompoc, California
frjstassi@gmail.com

Mark C. Davis
Computer Engineer
Mooresville, North Carolina
davismc@ieee.org

ABSTRACT

This paper focuses on the education of users as being as critical as the development of and the training for major information systems. The flow of information is critical to the nation's defense, including economic strength. Uniformed warfighters at virtually every level complain that they are inundated with too much information. Throughout history, a big part of the information flow issue is the artificial friction hampering information dissemination. Improvement in communications and presentation software in the last decade have made fundamental changes to improve information freedom resulting in: 1) information friction is greatly reduced by technology; rear guard action by institutions and governments can delay, but not prevent this trend, 2) what people know is much more limited by their interest than by the cost or effort of accessing the information, and 3) there are military counterparts to these issues. Current education methods have inadequately prepared the population to deal with this environment. This paper will identify and address the military concerns, both historically and prospectively. It will revivify time-honored theories on the "friction" of war, and recast them in terms of the friction of Information flow. During current research, the authors observed need for a practical approach to enable people to learn differently *e.g*. assigning a book to read may no longer be optimal. Pedagogical and technical advances developed at the University of Sothern California would address these issues. Artificial Intelligence (A/I) programs have been shown to be effective in enhancing any requisite education. USC's Quantum Annealer should demonstrate quantum computing's untapped power in the exploitation of very large data management. The paper describes these capabilities and sets out how they would be employed. The lowering of information friction should dramatically improve both economic strength and defense communication efficacy, but only if innovative education is implemented to enable this.

ABOUT THE AUTHORS

Dan M. Davis, J.D. is a consultant for the Institute for Creative Technologies, University of Southern California, focusing on large-scale DoD simulations. 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.

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.

Mark C. Davis, Ph.D. is currently 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, imbedded 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 an Submarine Officer for twelve years before leaving the service 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, where his advisor was Professor Fredrick P. Books.