

Advanced Technologies to Enhance Education to Optimize Information Flow Utilization

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ABSTRACT

This paper focuses on the education of users as being as critical as development of and training for big data 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 issue with information flow is the increase in artificial friction in information dissemination. Recent changes in this situation leads to some broad conclusions: 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 finding the information, 3) already, many choices are made more by preference than by cost, and 4) there are military analogs to these issues. Current education techniques 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 pedagogy 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 Southern California would address these issues. Artificial Intelligence (A/I) programs have been shown to be effective in enhancing the required education. USC's Quantum Annealer should bring quantum computing's untapped power to the exploitation of very large data manipulation problems. The lowering of information friction should dramatically improve both economic strength and defense communication efficacy, but only if education enables this. The response to these factors could have major impacts on national defense.

ABOUT THE AUTHORS

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.

Dan M. Davis is a consultant for the Institute for Creative Technologies, University of Southern California, focusing on large-scale distributed DoD simulations. Before retiring, he was the Director of the JESPP project at USC for a decade. 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 at the Maui High Performance Computing Center as the Director of Contracts and Finance and 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, U.S.N. He received B.A. and J.D. degrees from the University of Colorado in Boulder.