Enhancements for Homeschooling and ADL: Virtual Humans, Technologies and Insights

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ABSTRACT

Homeschooling and DoD Advanced Distributed Learning (ADL) have many goals in common, so increasing the collaborative research and collegial information exchange between their respective communities would be mutually advantageous. The emerging capabilities of virtual humans provide a useful prototype of how both homeschooling and ADL can benefit from emerging technological advances. This paper begins with an examination of the home schooling movement in the United States, including a review of its foundations, demographics, results and trends. In examining the goals of homeschooling parents, the four major reasons cited by at least half of those parents are considered and explicated: opposition to other school environments, provision of moral instruction, inclusion of religious instruction and dissatisfaction with academic pedagogies. Also meriting review are the hurdles faced by homeschool teachers and students, followed by an item-by-item comparison with analogous challenges for ADL provisioners and learners. A short analysis of the constraints on the two communities focuses on the differences between the family limitations and the defense organization restrictions. The authors then present data on the current scope, instantiations, and achievements of the two efforts. Many of the technologies currently in use are reviewed and discussed, concentrating on computer-aided education and distributed learning. Emerging technologies based on artificial intelligence, natural language processing, and virtual humans are described and considered. Their uses in various contexts provide sufficient data to quantify the impact on subjects and the authors adduce findings from research to support their thesis that increased use of these technologies would be beneficial both to homeschooled students and to DoD Learners. The paper closes with an evaluation of the arc of current research, the recognition of prenascent capabilities (*e.g.* quantum computing), the burgeoning needs of both communities, and the need to nurture a synergistic exchange between homeschool advocates and ADL architects.

ABOUT THE AUTHORS

Dan M. Davis is a consultant for the University of Southern California, focusing on large-scale distributed DoD simulations. Prior to his retirement, for a decade he was the Director of USC's JESPP Project for JFCOM. In the '90's, as the Assistant Director of Caltech's Center for Advanced Computing Research, he managed Synthetic Forces Express, bringing HPC to DoD simulations. Prior experience includes serving as a Director at the Maui High Performance Computing Center and as a Software Engineer 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, Cryptologic Specialty, U.S.N.R. He received B.A. and J.D. degrees from the University of Colorado in Boulder.

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, 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 an Submarine Officer for twelve years, including one duty

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Nancy L H. Young is an experienced Home Schooling Consultant. Among her many qualifications are the home schooling of two children one of whom has already graduated from Carnegie Mellon University as a Chemical Engineer and the other is . She also has a nearly ten years' experience with many aspects of home schooling techniques and problems. She is an experienced educator in both organizational and community health environments in the Washington D.C. area. Nancy earned a B.S,N. degree from Duke University and is ABT in a M.S.N (Administration) program at the George Washington University.

Laurel K. Davis is the President and CEO of Next Generation Leaders, Inc., an independent educational consulting and research organization in Culver City, California. She is an experienced classroom educator who has served in several public schools in the Los Angeles basin. Her current activities include teacher training, consulting on the transition from one school environment to another, creation of materials to address skills shown to impact academic success such as decision - making and learning style awareness. Approximately half of her students are homeschooled. She has developed and fielded several programs on leadership training and assessment. She received a B.A. in Communications and a teaching credential and M.Ed., all from the University of California, Los Angeles.