Enhancing Education Menteeship:
Improving On-Line Career Selection for STEM Personnel

Dan M. Davis
HPC-Education - Consulting for
University of Southern California
6275 E. Sixth Street
Long Beach CA 90803
310 909-3487
dmdavis@acm.org

Karen B. Predovich
High School Counselor
Cañon City CO
predovichk@gmail.com

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

Howard Spaulding
Training Consultant
Arlington, Texas
pirate612@cablelynx.com

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Abstract: *The nation suffers from a personnel shortfall in the Science, Technology, Engineering and Mathematics (STEM) fields and this paper addresses improving guidance for pre-college youth. As on-line educational systems become more prevalent, one aspect that may be impacted is educational and career counseling. This may well have a deleterious impact on the nation. The authors are experienced educational mentors who have identified major impediments in this area, e.g. the lack of profession-awareness among U.S. students. This lack of awareness is characterized and quantified in this paper and the negative impacts are described and analyzed. Both anecdotal and statistical data are adduced to show the need of significant reformation of the approaches currently implemented. Using statistics that enumerate the extent of untapped human resources in this country's public, private and schools, the paper outlines the societal and personal pressures that constrain the output of STEM personnel at all levels. Further, they present on-line approaches to ameliorating these problems. The authors discuss their activities in creating an on-line series of technical mentors for prospective technical professionals and they discuss their findings of a distinct lack of what they term "menteeship." They outline their experience with the students' inability to formulate good questions for the mentor, the preponderance of images based on fictional characters in the media, and the reliance on adults to make decision for them. They close by describing their early attempts and successes with using Virtual Humans as both trainers and as counselors to overcome these obstacles.*

Authors' Biographies

Dan M. Davis is now a consultant for the University of Southern California, focusing on large-scale distributed DoD training, education and avatar mentors. Pre-retirement, he was the Director of USC's JESPP project for JFCOM 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 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.

Karen B. Predovich continues to consult in educational matters after retiring as a long-time high school counselor for pre-college students in a modestly sized Colorado city. She was active in her professional life in finding assets for students outside of major metropolitan areas, where professional role models and mentors are very difficult to locate. Her observations have resulted in a professional stance of articulating the need for and the parameters of a new approach to guidance counseling on a national basis. Karen has focused decades of her counseling in characterizing the difficulties of finding technically oriented mentors in geographically remote or socially isolated areas. She received a BA and an MA in Guidance and Counseling from Western State Colorado University (formerly Western State College of Colorado.)

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. In the past, she has been on the research staff at both the California Institute of Technology (Caltech) and the Information Sciences Institute of the University of Southern 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.

Howard Spaulding is a retired Cryptologic Technician (Interpretive) Senior Chief Petty Officer and recently retired from Schneider National where his duties focused on training. His military service spanned three decades including 28 months in Viet Nam as a Marine Cryptologic Linguist. His Naval service included tours in the Philippines, Thailand and Japan. He also served as the Assistant Officer in Charge during the development of a highly technical project under the supervision of CNSG and SPAWAR and was instrumental in the interior design of the ES-3A Aircraft. He made two deployments aboard an Allied Naval vessel as the lone area/target expert. He has been at the forefront of career path decisions of other personnel in both the military and civilian sectors. He received a BA from California State University, Long Beach in 1983 while still on active duty.