Informing and Promoting Technical Career Choices: Roadmaps for the Future

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ABSTRACT

The issue addressed by this paper is that of providing the nation sufficient technically qualified personnel to maintain national economic strength and defense ascendency. Considered first is the current need and prospective shortfall in Science, Technology, Engineering and Math (STEM) personnel. The genesis of the false impressions that many students have about STEM professions is documented. These are often based on media and popular culture; the negative impacts are outlined. The authors have careers of varying durations, but all have extensive experience with the career decisions from high school through to final career choices in early adulthood. Two approaches are reported and analyzed: 1) the use of on-line "conversational avatars" to act as mentors for individuals choosing careers and 2) staging public gatherings for young people to visit with actual STEM personnel. In the case of the on-line solution, there is a brief discussion of the USC/ONR MentorPal project. Its focus is on target populations that have little access to STEM professionals to act as mentors due to geographical remoteness or Socio Economic Status (SES) disadvantage. Then, the bulk of the paper describes the authors' leadership and participation in providing a STEM Fair so students in the Los Angeles Basin can have direct contact with vital, engaging and compelling researchers. The authors cover how important decisions were made about: what the ultimate goals were, who should present science at the fair, which groups to target for invitations, ways to convey the science via posters, how to quantify attendance, and in what ways to best characterize the impact on the attendees. 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. Future research plans are described and evaluated.

ABOUT THE AUTHORS

Dan M. Davis 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.

Julianne M. Nordhagen is an Ensign in the U.S. Navy and is attached to the NROTC unit at USC, where she is assigned to collaborate on research at the Institute for Creative Technologies (ICT). As an Industrial and Systems Engineering (ISE) student, Julianne cultivated the analytical and technical skills required for this project, including optimizing the performance of large scale systems and applying computational methods for scheduling and forecasting. She has professional experience using integrated planning software like SAP and NetSuite ERP. She was selected to be one of the mentors for ICT's MentorPal project for the Office of Naval Research. Next April, she will begin her Naval Aviator training at the Naval Air Technical Training Center in Pensacola Florida. Ensign Nordhagen earned an ISE B.S. degree from the University of Southern California.

John J. Lazzeroni is an Electrical Engineering student in the Viterbi School of Engineering at the University of Southern California. He is currently serving as a Research Assistant and Project Manger in the Armani Research Laboratory there. His research interest flow in many directions, but he is interested in the need to attract more young people to the technical fields. His duties in the lab include organizing the EngX STEM Fair to try to provide a background for students of all Socio Economic Statuses. He is a Midshipman, First Class in NROTC at USC, where he has been selected as the Battalion Commander for the midshipmen. MIDN 1/C Lazzeroni expects to graduate and to be commissioned in the US Navy later this Spring. John is expecting orders to Nuclear Power training. He anticipates receiving a BS in Electrical Engineering from USC in June.

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.