

# Addressing Misconceptions in Career Selection: Research-based Implementations for STEM Students

**Dan M. Davis & Jennifer H. Nolan**  
Catholic Polytechnic University  
Pasadena, California  
{ddavis & jnolan} @catholicpolytechnic.org

**Karen B. Predovich**  
Academic Counselor  
Cañon City, Colorado  
predovichk@gmail.com

**Judith L. Jacobus**  
Speech & Language  
Seal Beach, California  
jjacobus@hpc-educ.org

## ABSTRACT

This paper discusses the response to the lack of solid informational foundations on which students can make important decisions: what college majors and career paths to pursue. Shortfalls are described in STEM professionals needed to support DoD objectives for the defense of the nation. The major issues are lack of exposure to practicing professionals, reliance on fictional portrayals of professions, and assumptions most professionals make that everyone knows what their daily activities are. The authors report on their recent project prototyping a computer agent for mentoring students about STEM careers. It was observed that high school seniors not only lacked detailed knowledge of the STEM professions, there was an almost total lack of comprehension of major parameters that defined defining fulfilling careers. The adolescents were focused on theatrical stereotypes of the professions and on dreams of a fanciful work experience. The paper then outlines the work on the virtual mentor and explains the dichotomy between the data conveyed and the impact on the students. Next, a program is outlined to ameliorate the missing reasoned framework and to fill the gap between the questions they should have asked and what they really asked. The emerging technologies enabling such an effort are identified. Other researchers' efforts and findings and the local team's insights are adduced to support the paper's thesis that this effort is vital for both this issue and extensible for other projects using the computer/human interfaces. The choices of appropriate metrics are considered and analyzed.

## ABOUT THE AUTHORS

**Dan M. Davis, CDR, USN, Ret.** is a Research Associate Professor at Catholic Polytechnic University and 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 in computer research roles 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. While in the Marine Corps, he saw duty in Vietnam as a Cryptologist and retired in 2002 as a Commander, U.S.N. He received B.A. and J.D. degrees from the University of Colorado in Boulder.

**Jennifer H. Nolan, PhD**, is the President of Catholic Polytechnic University and Professor of Psychology in their College of Arts and Sciences. Her earlier work specialized in memory, dementias, stroke and insulin resistance. She is a brain plasticity specialist and certified Cogmed provider. Previously, she was the C.O.O. and co-founder of a stroke and brain injury rehabilitation center. Dr. Nolan has taught university courses at the University of California Irvine, Loyola Marymount University, and Glendale Community College. She has conducted local and nationwide clinical trials, and published in both scientific journals and popular magazines. She received a BA in Psychology from Loyola Marymount University, Los Angeles and a Ph.D. in Psychology from the Dept. of Cognitive Science at the University of California, Irvine.

**Karen B. Predovich, MA** 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 Colorado

University (formerly Western State College of Colorado.)

**Judith L. Jacobus, MA** is retired from a career of conducting speech therapy as a Speech and Language Specialist for more than two decades. Her experiences were in public schools settings in Orange County, California. She also previously taught for 12 years as a classroom teacher in multi-cultural communities there. Judith currently volunteers her professional skills for a local police department, so has extensive experience with dysfunctional adults and children in a variety of both every-day and more traumatic situations. Her participation in amateur theater has more fully familiarized her with the characteristics of human behavior as they are projected via verbal, facial and body-language cues. This experience has also exposed her to the skill and art of the selection of appropriate persons for specific on-screen roles. Judith holds a lifetime Special Education Credential in Speech and Hearing Therapy, K-12 from the State of California. She earned a B. A. Degree in Speech Communications from the California State University Long Beach and an M. A. Degree in Teaching and Teacher Leadership from the Grand Canyon University in Glendale, Arizona.