

Evaluating Virtual Career Mentors: A Summer STEM Intern Environment

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ABSTRACT

The world faces a need for technically competent personnel in all of the Science, Technology, Engineering and Mathematics (STEM) disciplines. This is projected to be critical for the next decade at least, but there are two areas of concern: quantity and quality of new STEM professionals. The paper presents data and analyses on these issues, in order to lay the foundation for the work undertaken. The authors are members of a team working to address one aspect of that problem: the dearth of available mentors to advise prospective STEM students. The approach chosen was the creation of an interactive virtual mentor implemented via a large data store of short video clips, controlled by a natural language processing program to deliver a credible and engaging virtual conversation. After significant local testing, the team traveled to Monterey California where they evaluated their system by surveying a group of STEM interns, exposing them to the program, and then resurveying them. This paper lays out the procedures followed, the demographic data collected, the design of the survey instrument, the administrative issues and significant amounts of anecdotal observations and experiential insights on the process, the subjects and the potential impacts on the STEM community. This also presented an unusually good opportunity for the team to consider the two approaches to increasing STEM interest in the age group of between 16 and 18. The paper discusses their insights and their concerns for the future of both styles of remediation. Also mentioned are two other approaches: a series of lectures to high school students in both science and in general education class settings. The paper closes with a set of conclusory remarks and suggestions for actions by other STEM professionals and how the research may be a guide to how to assess such issues in the reader's own research environment.

ABOUT THE AUTHORS

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.

Sanad Z. Rizvi was a visiting Research Assistant at the Institute for Creative Technologies of the University of Southern California. His interests are in Machine Learning Research and its applications on the real world. Given his Computer Science background, he has accumulated good experience in software development through various research activities and programming projects. He is facile in Python and has made open source contributions to that language. Currently, he is focusing on Machine Learning/Deep Learning related research opportunities. He earned a B.Tech. degree in Computer Science and Engineering from the National Institute of Technology, Mysore, India.

Kenneth Shaw was a visiting Research Assistant at the Institute for Creative Technologies of the University of Southern California. He was selected to participate in the National Science Foundation's Research Experiences for Undergraduates in 2018. His major interests in research include creating life-like interactive experiences using artificial intelligence and motion-planning or decision making for robots. In addition, he is designing and producing new weather balloon electronics and software to better monitor lightning storms at his home institution, as well as con-

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