

Board 217: Building Interest in Technology Careers for High School Students

Dr. Karen Wosczyzna-Birch, CT College of Technology

Dr. Karen Wosczyzna-Birch has been a champion of engineering and technology education for the past 30 years. Since 1995, she has been the State Director of the CT College of Technology (COT) where her leadership has been instrumental in creating nationally recognized seamless pathway programs in engineering and technology between all 12 public community colleges in CT with 10 universities and high schools. She is also the Executive Director and Principal Investigator of the National Center for Next Generation Manufacturing (NCNGM), a National Science Foundation (NSF) Center of Excellence and a Professor of Applied Technology at Tunxis Community College. Since 2004, she has received over \$30M in funding from the NSF, including two grants for international partnerships. Karen has implemented strategies resulting in an increase in the enrollment of underrepresented populations in STEM programs at the community colleges.

Karen has received numerous awards for her accomplishments as a professor and for her passion for increasing the diversity of the STEM population including the 2016 Distinguished Service Award from the international honor society Epsilon Pi Tau (EPT), the 2018 CT Women of Innovation Award in the Postsecondary Academic Innovation & Leadership Category, the 2012 New England Board of Higher Education Excellence Award for the State of CT and most recently, the 2020 HI TEC Innovative Program of the Year Award and 2021 ITEEA Special Recognition Award. In 2014, she was invited to the White House College Opportunity Summit recognizing leaders like Karen for their commitment to STEM education. She also serves on numerous local and national boards including the Epsilon Pi Tau Honor Society, Hartford High's Pathway for Engineering and Green Technology, and the Connecticut Technical Education and Career System.

Wendy Robicheau

Building Interest in Technology Careers for High School Students

Introduction

The goal of the Building Career Interest in Computer Science through Advanced Real-World Projects (CICSTART) Program, funded by the National Science Foundation Advanced Technological Education (NSF ATE) program, is to provide additional professional and technical skills lessons to cohorts of high school students through a Saturday Program. The program utilizes industry-driven, project-based learning (PBL) and lessons in career and college readiness to prepare students for the technician workforce. Each student session consists of five consecutive Saturdays and is taught by a team of high school teachers, community college faculty, and instructors with expertise in professional skills, teambuilding, leadership, technical writing, coding, CAD software, and additional STEM competencies.

Program and participants

CICSTART is held on community college campuses to show students they are welcome in a college environment, which has inspired participants to have confidence in their own abilities to attend college and pursue educational and career goals in technology fields. Over three years, the program has provided 134 inner-city students from five high schools with out-of-school, hands-on educational programs focusing on professional skills, technical writing, and engineering technology competencies. The average participant demographics include 94% minority and 28% female students.

Most of the student participants are at a level of approximately three academic years behind their suburban counterparts, particularly in math skills. When needed, the CICSTART leadership team instructs the students in metric conversions and scientific notation, reinforced by homework assignments completed in a team environment. It should be noted that students from some of targeted schools have never been introduced to these subjects even in their senior year. The program instructors remain flexible with the curriculum to catch students up on skills and also ensure they experience the hands-on activities that utilize engineering and coding technologies. Participant feedback indicates students are very interested in the hands-on components of the program and many indicate that they found the program enjoyable and interesting. Several indicated an interest in pursuing engineering as a career. For hands-on technical activities, students use SolidWorks CAD software, learn about applications of 3d printing, and learn coding with micro:bits, which are programmable devices developed so students can gain experience with coding. Program participants are challenged with writing programs for the micro:bits for industry and real-world scenarios given to each team. For example, students code programs that allow them to measure the sound in their homes, play a rock-paper-scissors game, and measure the temperature with the integrated sensors of the micro:bit.

For the professional skills modules, students learn the DISC (Dominance, Influence, Steadiness and Conscientiousness) Behavioral Model, how to work in a team environment, leadership, and dealing with difficult people. The DISC model is covered in detail, so students learn not only about their behavioral style, but also how to recognize and interact with other behavioral styles. Student evaluations report that DISC learning is an important component of the program and is

immediately useful to understand and communicate both in school and in their personal lives. Students also learn about the basic professional skills needed in a work environment and the educational pathways available to guide them to a technician career.

Technical Skills Sets Taught	Professional Skills Sets Taught
CAD	DISC Behavioral Styles
3D Printing	Teambuilding
Programming	Leadership
Math/Physics	Dealing with Difficult People

Results

There is an increase in their self-esteem for participants when they realize that they can comprehend and master these professional and technical skills, with 95% of participants stating they would recommend the program to other students. Principals from participating high schools have commented that students who attended the program have demonstrated an improvement in their academics and behavior due to the knowledge of professional and technical skills that they have gleaned from the program.

Professional Development

The program’s leadership team disseminates best practices through presentations, social media, publications, and national workshops, including a four-day virtual Summer Teachers’ Workshop. This workshop brings high school and community college educators from throughout the United States to experience the same program that is used for the high school students. The participants are presented with the same professional skills and technical skills modules that the student participants are given. Summer Teachers’ Workshop participants are provided with stipends for their participation and have the opportunity to receive an additional stipend by submitting professional skills or technical skills curriculum based on what they learned during the workshop. Although virtual, participants are sent micro:bits and receive SolidWorks software licenses to retain the hands-on aspects of the program. In 2023, twelve educators from ten states participated in the workshop. The program’s outreach efforts and the national dissemination of best practices for engaging underrepresented populations in technology careers has a national impact that will potentially increase the diversity of the technician workforce.