The COSEE-TEK and LSAMP Partnership – Providing Ocean Science and Technology Opportunities for Underrepresented Students

by Ivar G. Babb and Diana Payne

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UConn Marine Sciences research specialist John Hamilton works with UConn students learning to strip and splice electrical wires. Photo credit: Ivar Babb

continued on next page
For the past three years the Center for Ocean Sciences Education Excellence – Technology and Engineering for Knowledge (COSEE-TEK) has collaborated with the Louis Stokes Alliance for Minority Participation (LSAMP) to provide innovative ocean science and technology experiences for underrepresented minority students, to help them succeed in Science, Technology, Engineering, and Mathematics (STEM) fields. (http://www.lsamp.uconn.edu/about.html). Based on assessment and feedback from participants, the collaboration has evolved over the three years.

In year one (2012) 11 undergraduate and two graduate students spent two days immersed in ocean science and technology at UConn’s Avery Point campus and Project Oceanology participating in the Ocean Science and Technology Institute (OSTI).

“OSTI’s goals were to provide students an orientation to ocean science and technology, expose them to ocean science and technology careers,” said Joy Erickson, UConn’s LSAMP Coordinator. “We also provided the opportunity to work as a team to build a hydrophone and conduct hands-on oceanographic sampling on board the Project Oceanology’s EnviroLab2 vessel.”

In the second year, a more facilitated inquiry approach was adopted and the program was renamed the Ocean Science and Technology Challenge (OSTC). OSTC began with a kickoff in January 2013 at the Northeast LSAMP Alliance Winter symposium on the UConn main campus in Storrs, Connecticut. Nine students from UConn and UMass-Amherst participated in a two-day field experience last April at the UConn Avery Point campus in Groton, Connecticut. In addition to exposing students to ocean science and technology careers, an added dimension of the OSTC was a focus on 21st century skills.

The National Research Council (NRC) examined the nature of deeper learning to define the range of attributes comprising 21st century skills, describe how they relate to each other, summarize research demonstrating the importance of these skills to academic and workforce success and identify what works to build these skills (NRC, 2012). The report describes three “domains of competence” and identifies clusters of closely related competencies within each: 1) the cognitive domain (critical thinking, problem-solving, decision making, creativity), 2) intrapersonal domain (flexibility, initiative, self-direction, perseverance) and interpersonal domain (teamwork, communication, cooperation, leadership).

In the third year, the team realized the goal of having all five university partners in the LSAMP Northeast Alliance (Northeastern University, UConn, UMass, University of Rhode Island, and Worcester Polytechnic Institution) participate in the OSTC. The 2014 OSTC program improvements included an earlier start in the fall. The program included an overview and orientation to the OSTC concept and a presentation of the theme for 2014, “Autonomous Samplers.”

For the next four months the student teams from each school met periodically with their Tech Mentors either in person or via a virtual Webex teleconference system. Students were assigned team roles such as leader, budget, or reporter. They identified an autonomous sampler idea and the design process began. Teams were given a $300 budget to work within to purchase sensors and materials for their sampler. The OSTC culminated with the two-day hands-on building and testing of their designs at UConn Avery Point that included final design/building of the teams’ technologies, in-tank testing, orientation to ocean technologies including a remotely operated vehicle challenge. Finally, teams deployed their technologies for an overnight test of their devices to sample the ocean simultaneously.

The LSAMP OSTC actively involved students from all five of the academic institutions comprising the LSAMP Northeast Alliance, making this one of the first times that all members of the Alliance collaborated on a joint project. The OSTC involved 25 undergraduate students from the five universities participating in the project. The open-ended nature of a guided technology challenge provided an effective venue for undergraduate students to work in teams to develop 21st Skills. The five participating schools each came up with a technology they wanted to develop and worked closely with a COSEE-TEK technical advisor to take their idea from concept to reality. The students learned simple hands on tasks such as splicing wires as well as broader skills such as how to communicate and work effectively in a team setting.

As a national network the LSAMP provides a ready-made network to engage underrepresented undergraduate students in ocean science and technology and the COSEE-TEK team looks forward to continuing the OSTC in the coming year.
What are “Underrepresented Students” in the sciences?

This is a broad term referring to groups historically less engaged in science, technology, engineering and math. It can include racial and ethnic minorities, females, and/or those with disabilities.

Resources for further reading:
COSEE-TEK: http://www.cosee.net/
Louis Stokes Alliance for Minority Participation (LSAMP): http://lsamp.uconn.edu/

A trio of students from UMass Dartmouth work together on a computer coding project. Photo credit: Ivar Babb

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