

The 2009-10 Campus Action Project provided a platform to address some of the barriers girls and women face entering and staying in science, technology, engineering, and mathematics fields.

Twelve teams from around the country were selected to implement projects based on recommendations from AAUW's 2010 research report, [*Why So Few? Women and Girls in Science, Technology, Engineering and Mathematics.*](#)

2009-10 CAP Team: CA University of PA

Through their project CSI: California, PA, Engaging and Inspiring Girls to Explore Their World, the CAP team at California University of Pennsylvania (CAL U) set out to break down the personal barriers that may prevent female middle school students and female undergraduate students from pursuing interests in science, technology, engineering, and mathematics (STEM). In order to achieve this, the CAP team on campus created a support system that included collaborative activities between female faculty and female undergraduate STEM students. The activities included the CAL U project team and the undergraduate students developing and implementing two “Girls’ Night Out” at the middle school and a culminating event on the campus that hosted the middle school students and their parents.

Each “Girls’ Night Out” event contained four hands-on activity stations that created interest and career awareness in the students who were participating. For the Technology and Engineering theme night, the female technology education undergraduate students created activities that focused on different areas of technology and engineering; the areas selected were design and engineering, transportation, manufacturing and communications. In teams, students completed the following stations:

- designed and built a 10” toothpick structure that supported and kept a tennis ball in place;
- created balloon cars;
- created paper rockets;
- created Mason jar cookie mix with specific measurements and layers, and;
- created personalized photo frames.

For the Science theme night, the female science undergraduate students created activities that focused on the science areas of chemistry and physics. The students completed the following stations:

- making ice cream with liquid nitrogen;
- making super bouncy balls;
- making lip balm, and;
- learning the physics behind music.

The parents and the middle school student participants were invited to the CAL U campus for the culminating event. The CAL U Forensics Club created hands-on crime scene activities. The students completed the following stations:

- making a casting of a foot print;
- examining how fingerprints are captured and analyzed;
- collecting and recording evidence on a crime scene, and;
- investigating a mock crime scene.

While the students were completing the activities, the parents were given information about:

- the outlook and need for a diverse STEM workforce in Pennsylvania;
- how to continue to encourage their daughters to pursue interests in STEM areas;
- scholarship opportunities in STEM, and;
- the STEM programs at California University of Pennsylvania.

The middle students completed pre-activity surveys prior to the first Girls' Night Out and a post-activity survey the week following the culminating activity. The number of students indicating interest in pursuing a career in an engineering-related field or becoming an engineer increased significantly from the pre to post survey.

Major Accomplishments

From the team:

- Our expectation for the number of students who would participate in the project was exceeded. We had originally only planned for 40; however, 58 students had participated in one or more of the planned activities.

The survey results indicated that the students' career goals and plans for enrolling in STEM-related courses changed as a result of their participation in the project.

2009-10 CAP Team: Claremont Colleges

The CAP team at the Claremont Colleges (CA) created an “Opportunities Clinic” program to increase student interest in and awareness of careers/opportunities in STEM fields and to provide experience in college level science. Program sessions took place at the Claremont Colleges in order to introduce girls to hand-on science in a university science environment.

Twelve ninth and tenth graders from Pomona High School were recruited to work with college students from the Claremont Colleges. The students chose to develop a sustainable garden across the semester for their project. The group split into two groups and two college students headed each group, with support from a fifth student.

One of the two groups focused on biology/chemistry group and oversaw plant selection and environmental factors (water pH, soil particle size, etc.) that affect plant development and growth. The students designed and tested different environmental conditions and then selected the environmental conditions are ideal for the plants selected and developed a plan to ensure that these conditions are maintained.

The second group focused on ecology/engineering and researched, designed, and built the box and the irrigation system for the garden.

After the initial research and build/test phases, the teams jointly installed the garden at their high school.

The CAP team then held a successful capstone event during which the teams presented their work in the program. The event program also included Harvey Mudd College president (and computer scientist) Maria Klawe and a keynote speaker, Chicana plant biologist MariaElena Zavala. More than 50 people attended, including many family members of the high school girls.

Major Accomplishments

From the team:

Meetings: We began with about twelve girls; nine completed the project. There were 11 meetings, with varying attendance; girls also worked on the project independently. Due to time constraints, the Ecology/Engineering focused on engineering, with about four participants every meeting. Mentors observed that participants gained confidence and learned to motivate each other, evidenced by participation during meetings and interactions with each other. Several revised career goals over the course of the project (some expressed a new interest in engineering).

Garden. A demonstration garden was constructed (during a day-long installation/planting session) as part of an existing school garden.

General learning: The girls learned about: lab safety and equipment; library and campus resources; engineering aspects of creating a garden, including irrigation; aspects of plant biology and soil chemistry; native plants; giving a project presentation. They also gained experience in working collaboratively and public speaking.

Survey results: A student-designed survey was completed by seven of the girls who completed the project. All but one reported either a continued or increased strong interest in science. Participants reported learning about the applicability of science to the real world, enjoying collaboration, and learning about areas of science they hadn't known much about.

2009-10 CAP Team: Dakota State U.

The CAP team at Dakota State University (DSU) conducted their project through the campus Women in Science and Technology (WIST) program, which strives to mentor and retain female students in traditionally male dominated fields and to promote careers in science and technology to women. The CAP-specific project focused on career mentoring programs, a series of workshops with invited speakers, and the promotion of careers in science and technology to female students in local middle and high schools.

First, the team offered four workshops entitled: "Exploring Science and Technology Careers in South Dakota," "Careers in Mathematics," "Careers in Science," and "Careers in Technology." There were four or five speakers per workshop and they came from diverse backgrounds so the students received a broad cross section of available careers in each STEM field. The team invited students from local middle and high schools to attend and had a goal of 20-30 attendees per workshop. They exceeded that goal as there were 40-50 students who attended each workshop.

Second, the DSU team mentored 128 K-12 student participants in a state Design Challenge.

Last, the team hosted a Women in Science conference. They expected about 200-300 students and in the end, 600 8th graders attended. Through exhibits, seminars, and meetings, the students gained interviewing skills to help them successfully compete for jobs, had the opportunity to interact with women pursuing their careers in STEM oriented fields, and to learn about both the hard skills and soft skills necessary to be successful in the field. The students were also exposed to different employment opportunities available to those with advanced degrees.

Major Accomplishments

There was more interest than anticipated in each aspect of the project and consequently the team had significantly higher attendance rates. From pre- and post-surveys at the workshops, the team found that the attendees felt more confident about pursuing their careers in STEM fields and many of them considered continuing the education beyond the BS degree as there were opportunities they didn't consider previously. Members of the South Dakota Board of Regents and state representatives who helped the team promote their activities were impressed and encouraged the team to continue their efforts in the future. Students who participated in the Design Challenge gave great feedback and said they liked being able to talk to their peers (the DSU students) versus adults. The students who attended the Women in Science conference gave positive feedback and constructive suggestions for next year.

From the team lead:

I am very confident that we accomplished our goal and hopefully helped many students to expand their way of thinking about the future.

2009-10 CAP Team: Massasoit C.C.

Every spring, Massasoit Community College accepts only 160 students from nearly 1000 mostly female applicants to its nursing and allied health programs. Hundreds of students who have taken the required science and math courses for these programs are disappointed and left with no clear career options. The main goal of the CAP team at Massasoit Community College, then, was to increase awareness among these students of other career options through: the creation of informational bulletin boards on careers in science, technology, engineering and mathematics (STEM); a professional women's panel and luncheon; and the creation of a brochure on STEM careers.

A team of six women student worked on the project *Beyond Health Care: Moving Women into Non-Traditional STEM Careers*. They researched alternative careers in STEM and then created informational bulletin boards that were moved around the campus for maximum visibility.

A combined STEM Career Day and Equal Pay Day event on April 23, 2010, in the Student Center brought together the CAP team, advisors, faculty, staff, and students. Beginning at 11 a.m., team members monitored their bulletin boards in the Student Center to explain their findings and answer questions. In recognition of Equal Pay Day, attendees were encouraged to sign an on-line petition in support of the Paycheck Fairness Act pending before the Senate. A luncheon followed at which CAP team members were recognized for their work. Then, a featured panel of five professional women active in the STEM fields shared their education and their work experience. Three of the five were Massasoit Community College graduates. A program of the day's events and the STEM career informational brochures designed by the CAP Team were distributed to all.

Major Accomplishments

Many students were observed reading the information on the roaming bulletin boards.

A diverse group of approximately 100 students, faculty, and staff examined the materials on display, and 50 attended the luncheon and panel presentation for the STEM Career Day event. A follow-up survey was sent by e-mail to our targeted student group to measure the impact of the Career Day events and bulletin board displays. The results showed a positive, measurable change in respondents' attitudes, knowledge, and response to STEM-related careers and courses. Moreover, exposure to the professional women panelists, some of whom were Massasoit graduates, presented the female students with positive role models. Informal conversations with some students revealed a new openness to career options beyond health care. These are the results the team said they were hoping to achieve with the CAP initiative.

2009-10 CAP Team: U of Mississippi

In order to increase the retention of students in the STEM fields, the CAP team at the University of Mississippi, Oxford, designed the project “Roundtable Mentoring and Student Retention: What Women Need to Know to Survive and Succeed in STEM Careers.” They sponsored five dinner roundtables throughout the spring 2010 semester, each focusing on the following topics: (1) An Overview: Women in STEM; (2) Career Options in STEM; (3) Career vs. Home: A False Dichotomy? (4) Does Gender Bias in the Workplace Exist? (5) Answers to all the Questions you Hesitated to Ask but Wanted to.” They felt the project accomplished its goal of helping to form networks between female students and faculty in STEM and of collecting data from STEM students that will help the departments retain females. In all, it engaged key units at the university, including higher administration, thereby successfully bringing them on board to attend to women’s recruitment and retention in STEM.

Major Accomplishments

An average of 50 people attended each roundtable and most people attended multiple sessions, showing the success of the roundtables to help build a community and retain people. The CAP team project received campus-wide support, both in terms of funding and participation. The Office of Research and Sponsored Programs and the College of Liberal Arts matched the AAUW grant, and many campus leaders, including the new chancellor, a physician, were invited to either give greetings or serve as roundtable panelists.

2009-10 CAP Team: North Carolina CU

The North Carolina Central University's Women Inspiring Learning (Momentum)- W.I.L.L. program focused on girls in the Durham community and cultivated their aptitude for science by pairing them with a mentor, exposing them to many career possibilities and providing academic enrichment with hands-on experience. Another program component included developing an encouraging environment for participants by involving parents during the program.

Twenty middle school girls were selected to participate in the six Saturday program through an application process. An NCCU undergraduate woman majoring in a STEM area served as a mentor at a 2:1 ratio. Five science professionals were also paired as mentors to the larger cohort of middle school girls. In addition to mentoring time, seminars, and hands-on-activities during the Saturday sessions, the girls went on field trips to local science, technology, engineering, and mathematics sites for real-world exposure.

Major Accomplishments

The program was a huge success as evidenced by the direct observation, participant and parent surveys and portfolios. Participants valued their relationships with their mentors and enjoyed the science activities and experiments, and parents developed an electronic parent network that still continues after the program has ended.

The team was pleasantly surprised when the parents formed a parent network during the orientation program. Since then, they have been emailing and posting on the WILL website informing each other of enrichment opportunities and relevant articles.

The program has been so successful that the chair of the biotechnology and bio-manufacturing school (BRITE) has asked to meet with the faculty Project Director to discuss institutionalizing the program. Also, the Math and Science Educational Consortium which includes science programs from around the region, has asked the WILL program to be a member program.

2009-10 CAP Team: RIT

The EMPOWER project of the Rochester Institute of Technology CAP team consisted of a series of workshops for Engineering Technology and Packaging Science students at RIT. The workshops focused on networking effectively, developing a professional portfolio, and dressing for success and were designed to build self-confidence in professional skills needed to succeed in the STEM fields. The workshops also helped develop a community of women through networking activities with fellow students, faculty, alumni, and professional women. The workshops culminated in an event where the students could practice the skills they learned and network with professional women in STEM fields.

Major Accomplishments

The EMPOWER project successfully met the program goals. Attendance at EMPOWER events was significantly higher than other similar events held in our college in the past. Students participating in the EMPOWER program reported an improved ability to network and dress professionally. Over eighty women were directly impacted by the EMPOWER program at RIT.

2009-10 CAP Team: U of AL, Huntsville

The objective of the University of Alabama, Huntsville, CAP project was to stimulate recruitment and retention of women students in engineering by strengthening supportive links among current students, prospective non-traditional students, and engineering professionals. The project specifically addressed two barriers to retaining women in engineering and recruiting non-traditional students: 1) limited campus and community support networks, and 2) limited perception of engineering's relevance to women. In order to address these barriers, the project included three organized luncheon discussion panels, a STEM division at a campus social change EXPO, and the development of print and digital resources to provide continued information about women in engineering.

The luncheons provided opportunities for current and potential students to interact with each other, to hear professional speakers in the field of engineering, and to interact with faculty. The luncheon topics were: "Building Intergenerational Support Networks," "Choices and Resources for Non-traditional Women Students," and "Women's Experiences in Engineering."

The CAP team also participated in organizing a campus-wide "Charged! Up for a Change EXPO," a campus fair that highlighted ways students can stimulate positive social change. While the event encompassed areas other than engineering, the CAP booth had a salient presence and was part of an effort to bring together other booths which focused on how science and engineering can be used in humanitarian ways, such as Society of Women Engineering and Engineers Without Borders.

The CAP team members produced creative and professional-looking digital and print materials offering diverse, relevant, and humanitarian views of engineering and practical information for returning students. Seven hundred copies of a pamphlet with detailed and practical information for women interested in engineering were distributed in social networks of the women who participated in the programs, and it remain an on-going part of the college recruitment. In addition, they added over \$350 worth of books and materials on women in engineering to the University Women's Resource Center.

Major Accomplishments

One goal for our luncheons was to have at least one professional, one engineering faculty, and one student provide information at each event, and they more than achieved this goal. Their target for audience attendance was starting with 10 participants and increasing that by 55%. They ended up having 31 people attend the first lunch, 37 at the second and 38 at the third. At each of consecutive luncheons over 50% were new attendees. Overall they reached 67 unique individuals. Survey evaluations of the luncheons from the attendees were positive with the most commonly mentioned benefit being that there was networking between women in engineering.

The Charged up for Change EXPO was a larger success than they anticipated. Around 500 people stopped by their booths and the event was covered on the television stations in the

community. They were able to distribute 250 invitation cards describing the project and produce 700 high-glossy pamphlets that will be used as an on-going recruitment tool for women in engineering.

The team felt that the successful collaboration between the Women's Studies Program and the Engineering College has been useful in laying the groundwork for future initiatives to encourage women into the field of engineering.

2009-10 CAP Team: UC Davis

The University of California, Davis (UC Davis) CAP Team project “WISTEM for Girls” project promoted engagement with “Women In STEM” fields for girls ages 10 – 13, through hands-on workshops focused on computer science and technology. The team hoped to break down barriers and enable girls to develop technological competence and confidence that is critical for them in order to see themselves as potential engineers/scientists in the future.

The UC Davis WISE Committee of the Women’s Resources and Research Center, in partnership with Isis-Education, a local non-profit, first piloted a curriculum that includes mentoring relationships between girls and UCD students (Phase I) and then held a large one-day WISTEM event (Phase II) featuring student technology demonstrations, and lab fieldtrips with faculty presentations. Phase III promises to include further collaborations, and future grant writing building from this experience.

Major Accomplishments

From the team

- Our Community Partner, Isis-Education, is a local non-profit developed by a Davis AAUW member. The CAP start-up project was an Isis-Ed pilot curriculum held over three 3-hour workshops, funded in part by the grant. Six 5th & 6th grade students from 3 schools, and 4 UCD mentors participated. Isis-Ed pilot lesson plans included binary numbers with beads; computer hardware/software; dissecting “dead” computers; robotics, and learning circuitry with Snap Circuits. These girls became the “Tech Leaders” demonstrating circuitry at the campus event. Isis-Ed now offers technology classes for girls on a regular basis.
- The UCD Campus “STEM for Girls” fair attracted 50 girls (target of 35), invited by 4 local schools based on interest/ability and under-represented/underserved status. Our schedule included: a pre-survey; Parto Aram of Isis-Ed on being an engineer. Snap Circuits demos and hands-on work; a visit by UCD Chancellor Linda Katehi, engineer & role model; lunch with 15+ mentors; lab tours to 2 of 6 labs: nanos, biomedical engineering, vivarium, bioreactor; aeronautics, and chemistry; post-survey and liquid nitrogen ice cream finale. Each participating school had science teachers present who received 4 Snap Circuit kits/school. Analysis of the survey results is included in our power-point presentation. We were thrilled with what the CAP project achieved.

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2009-10 CAP Team: University of Guam

Through their project "Portrait of a Scientist as a Young Woman," the CAP team at the University of Guam successfully created a film, generated some very unique posters, mentored student leaders, and developed some important new networks for students and the women and gender studies program.

Without having any prior experience creating a film, the CAP team produced a 45 minute film about women in STEM fields. Students and professionals were interviewed for the product and the team created a new superheroine, STEMA, who appeared throughout the film. Fifty-five people attended the film premiere.

The poster contest, open to elementary, middle and high school girls, generated lovely art. The posters, to be distributed before the start of the new academic year, will generate support and encouragement to young women in the public school system.

The CAP team felt that the student leaders were the most rewarding aspect of the grant project. They had great willingness to volunteer their free time and energy to this project, negotiating their work and school schedules. The student leaders gained useful experience working together, operating camera equipment, conducting interviews, and editing film. Further, the student team leaders expressed an interest in continuing to develop film-related research work in Women and Gender studies and in their other major course work.

Overall, the CAP team feels very pleased that through this project they created productive connections with women working in STEM fields who are passionate about sharing their experience and expertise with women and girls and consequently that the potential for future collaborations is high.

Major Accomplishments

The film project was extremely successful and the team was able to produce a 45-minute film because of the enthusiasm of the student film crew and the amount of people willing to be interviewed. In the filming and editing process the team members learned valuable new skills.

At the film premier, the CAP team distributed a survey to evaluate the impact of the film on attendees.

- 82 percent of attendees agreed that the film increased their knowledge of the opportunities girls and women have in STEM fields
- 80 percent believed that the film increased their knowledge of the barriers girls and women face when studying and working in STEM fields
- 92 percent of parents in the audience agreed that the film has made them want to talk to their daughters more about studying more STEM subjects

- 69 percent believe that the film has made them want to talk to their daughters more about pursuing a career in a STEM field
- 82 percent of the college or school-aged audience said that the film made them want to study more STEM subjects
- 53 percent responded that the film made them want to choose a career in a STEM field

Last, the project enabled the team to form many useful relationships. They established new relationships with women faculty at the institution and with female professionals outside of the University that they can collaborate with on future projects.

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2009-10 CAP Team: MSU

The CAP team at Mississippi University for Women sought to develop a successful intervention strategy for girls and children of color in the fifth grade. They had nine speakers give presentations on science and mathematics to three classes in Starkville, Mississippi. In addition, they had one control class, which did not have mentor presentations. They administered pre-surveys and post-surveys to the children.

They expected to see that children would be more interested in science and mathematics on the post-survey than the pre-survey because the mentors would provide them with role models. In comparing pre-survey and post-survey results, they saw no indication that the mentors created any significant attitude change. While there was no significant change in attitudes, mentors, classroom teachers, and students spoke highly of the experience.

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2009-10 CAP Team: Univ. of South FL

The CAP team from the University of South Florida, Sarasota-Manatee Campus hosted a day-long Girls STEM Summit for 160 girls from middle schools in Sarasota and Manatee Counties. The all-day Saturday campus event was filled with workshops, activities, and a panel of STEM female professionals who spoke with the girls about their experiences in the STEM fields and created a greater awareness of the many different career opportunities that are available. University student leaders served as role models and parents were involved in a workshop to guide them in supporting their daughters in pursuit of careers in STEM fields. Topics covered throughout the day included engineering, marine biology, mathematics, IT, medicine, and archaeology, and there was engaging research-based, hands-on activities and conversations with USF alumni and local female leaders in these fields. Academic advising in STEM disciplines, career exploration and parental guidance was also included in the program.

Major Accomplishments

The CAP team said the Summit was a fabulous event. The panel members gave strong messages about their careers, education and inspired the girls to take pride in their STEM talents. Thirteen workshops were held throughout the campus during the morning. Girls attended lunch and a Career Fair in the early afternoon. The rest of the afternoon was filled with hands-on activities for the girls, and 80 parents attended a career fair and parent workshop. The girls also witnessed a martial arts demonstration and heard closing remarks from Paulette Norvel Lewis, Regional Administrator of the US Department of Labor's Women's Bureau in Atlanta, Georgia.

In the post-survey results, 96 percent of the girls did not believe that boys are better at science and math, but 61 percent of the girls thought that other people believe that boys are better at science and math. Also 93 percent of the girls surveyed "strongly agreed" that more time should be spend on hands-on projects in science or technology activities at school.