
AC 2011-2806: NSF ATE CALIFORNIA REGIONAL CONSORTIUM FOR ENGINEERING ADVANCES IN TECHNOLOGICAL EDUCATION (CREATE) RENEWABLE ENERGY CENTER

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Kathleen Alfano is the Director and principal investigator of the National Science Foundation Advanced Technological Education (ATE) CREATE Regional Center of Excellence and has led the ten college consortium CREATE (California Regional Consortium for Engineering Advances in Technological Education) since its development in 1996-1997. She served as a Program Director and co-lead for the ATE Program at the National Science Foundation in Arlington, VA in 2007-2008 and previously as Dean of Academic Computing and Professional Programs and continues to be a faculty member at College of the Canyons. She has over twenty-five years of successful faculty leadership, administration of technical departments, and leadership of State and Federal curriculum projects, especially in the areas of technical education. Dr. Alfano has a B.S. in Chemistry, M.S. in Education, and a Ph.D. from UCLA in Higher Education and Adult Development.

**The California Regional Consortium for Engineering Advances
in Technological Education
NSF ATE CREATE Renewable Energy Center**

Background

The goal of the NSF ATE CREATE Renewable Energy Regional Center is to address the demonstrated high demand for renewable energy technicians in southern and central California as a multi-County consortium. The Center has objectives in five areas: 1) the development and refinement of modular in-class, on-line, and hybrid renewable energy curricula integrated into degree pathways concentrating on the areas of wind and solar photovoltaic and thermal technologies and energy efficiency and management that are tied to industry skills standards and certifications; 2) development and implementation of a technical teacher professional development program in renewable energy which will allow community college, high school teachers, and industry professionals recruited to be teachers to acquire the technical knowledge and certifications and pedagogical skills to teach renewable energy in their classrooms; 3) develop and implement a 2+2+2 pathway through partnership with high schools and universities to allow students interested in renewable energy careers to have a defined career ladder with multiple exit points integrated with industry certifications and college certificate and degree attainment; 4) conduct continuous assessment and evaluation with imbedded targeted research of curricular and professional development strategies to ensure that student, faculty, and industry goals are attained; and, 5) disseminate both the products and the partnership process to maximize the impact both regionally and nationally.

The CREATE faculty team has met monthly since 1996 to develop curricula, share equipment and expertise, conduct joint professional development, and work with employers together for the benefit of their students and their programs. The new renewable energy curricula is tied to industry and degree skills standards and certifications through a rigorous, documented DACUM process of testing regionally skills standards developed in cooperation with national leaders of industry in renewable energy. The consortia has acted as a strong advocate for AS and BS technical degree programs for the region and will be able to have new technical BS programs sponsored by CREATE in operation in year four in cooperation with California State University and UC partners. CREATE also develops, adapts, and disseminates curricula and material to other colleges needing support in the areas of renewable energy (specializing in wind and solar and electromechanical technologies).

The CREATE colleges act as demonstration sites for regional technical workshops that pilot test new curricula or delivery systems and innovative professional development, especially in the area of technical teacher training. Over 25,000 students have completed at least one CREATE-developed credit course. All CREATE courses apply to a degree and/or certificate. The strong partnerships with renewable energy employers, State agencies, and programs across the country will aid fulfillment of the high demonstrated technician need by a diverse and gender balanced student and faculty base. The consortium colleges are a diverse mix of rural, suburban, and urban and HSI community colleges serving 9 counties to promote greater access to the high

paying renewable energy jobs for the underrepresented and gender equality for renewable energy

This paper summarizes the objectives and the accomplishments and goals of the CREATE Center in its first year of its renewable energy focus.

CREATE Center Objectives and Accomplishments

4. Objectives, Activities, Deliverables/Performance Outcomes and Timeline

Objective 1. Curriculum Development and Adaptation--Develop, adapt, and implement regionally programs in renewable energy technology that reflect existing and emerging industry needs and that incorporate identified industry skills standards and certifications.

Performance Outcome--In response to regional industry needs, as well as state and national requirements, curricula at all partner colleges are being adapted to meet those very specific needs in order to make students qualified and competitive for employment for renewable energy careers, with particular focus on the needs for qualified wind and solar technicians.

1.A Verify key technical and soft/professional skills derived from both the State DACUM survey and focus group data already and match this data with existing national skills certifications and certification such as AWEA Skills Standards and NABCEP solar and small wind certifications and verify with renewable energy partners for regional needs through a rigorous validation process. (Years 1 November/December DACUM Process--Overseen by expert consultant Dennis Faber and the ATE TIME Center; Yrs 1-2 Review solar courses, solar focus group and NABCEP certification process for 10 colleges and targeted high school sites

1.B. Conduct a gap analysis of existing curricula in each of the consortium colleges and develop a task list of mentoring teams to include: refinement of core : December 2010 analysis and results will be presented.

1. C. Develop and Implement new wind, solar, and other renewable energy curricula, including renewable energy examples for mathematics and physics classes.

1.D. Pilot test and refine new wind, solar, and other renewable energy curricula methodologies, including in-class, in-lab, on-line, and hybrid delivery, using the extensive CREATE college and high school network to compare student learning of the same curricula using different methods.

Objective 2. Faculty professional development--Increase pools of teachers who are well-prepared to teach of Renewable Energy, especially Wind and Solar Technologies

Performance Outcome: The CREATE Consortium will complete regional technical and pedagogical faculty development to increase the pool of capable community college and high school renewable energy teachers. Facilitators will complete campus institutionalization of

workshops. The consortium will use the Teaching Ambassadors and Facilitators workshops to begin to share advanced content knowledge among consortium teachers, especially in areas industry highlighted as critical to the type of trained technician they are seeking.

2.A. 1. Summer and on-line Training: The faculty professional development team will conduct a minimum of two summer workshops each summer of the grant covering wind, solar, and fundamental electronics and mechatronics skills needed for teaching wind and solar technology. Specialty support through on-line and Web Ex Virtual conferences will take place a minimum of four times each year and each interested faculty will be assigned a technical mentor. Additionally the regular CREATE meetings will rotate meeting locations to highlight best practices in lab use and curriculum delivery.

2.A.2. Content Dissemination and Training: CREATE faculty will enrich teaching content areas through workshops including—Fundamentals of Wind and Solar Technologies; SCADA; Beginning and Advanced Renewable Energies

2.B.1. Pedagogical Facilitator Training: The facilitator trainers will continue to instruct interested faculty who wish to be trained as facilitators and open training to other faculty with emphasis on the CREATE region's renewable energy need areas.

2.B. 2. Pedagogical Training: faculty members will continue to offer traveling Teaching Ambassador Workshops to full-time and adjunct faculty with emphasis on wind and solar teachers using the "Teaching Skills Workshop"; "Teaching Dynamics: Getting Results" models;

2.B.3. Develop on-line tools for use of faculty in remote locations to share best practices

Objective--3. Develop and Articulate Pathways--Increase accessibility and availability of 2+2+2 pathways and articulation in the fields of Renewable Energy Technologies, esp. Wind and Solar.

Performance Outcome: The CREATE Consortium seeks to build pathways for both incoming students and students continuing from the community college developing a minimum of 30 articulated high schools and 3 articulated B.S. Interest-building presentations, field trips to the Wind and Solar Farms, and workshops at the high school level, particularly those focused on underrepresented populations (as many of the CREATE colleges are HSIs), coupled with quality mentoring and support for development of curricula to bridge gaps to accessible pathways to B.S. degrees will be assessed to ensure the consortium program maximizes student pathways.

3.A. Promote Transfer Programs—Classroom: Develop a media package with both print and video that highlights Wind and Solar and other Renewable Energies. Speak to currently enrolled students and future students to increase knowledge and encourage enrollment in the A.S. and B.S. programs with transfer agreements with CREATE

3.B. Promote Transfer Programs--Information and Expanded Opportunities: Provide accurate resources and materials to CREATE faculty and college counselors to promote CSU Programs;

collect and provide information on any four-year transfer programs that could provide B.A./B.S. to CREATE students

3.C. Promote Programs to High School Students-- Field Trips to Wind and Solar Farms: Promote site visits and on-campus presentations for currently enrolled high school students about opportunities in Renewable Energies;

3.D. Articulation Agreements—develop high school and four-year formal articulation agreements; list on www.assist.org; and post on CREATE website (www.create-california.org):

3.E. University Curriculum and Delivery-work with CREATE university faculty partners to support development of university curricula that bridges the community college to the B.S. programs.

Objective 4. Assessment--Refine and implement the current CREATE researcher, student, alumni surveys to yield a model assessment and evaluation that will follow-up with current and future students to apprise them of increased program & transfer opportunities & evaluate their success as they enter the workplace and/or transfer to measure longitudinally the success of the educational experience and disseminate the findings.

4.1. Student Follow-up Data: Design, implement and evaluate a form on department web site that former and current students can use to update their status: jobs, certifications, education. Send letters to all former students to inform them of the importance of gathering this information and instructions for completing the questionnaire.

4.2. Project Assessment Data Collection: Monitor the 2+2+2 program & collect assessment data; Facilitate research on improving utilization of on-line forum on pedagogy skills

Objective 5. Institutionalize and disseminate both the products and the partnership process to maximize the impact both regionally and nationally.

Performance Objective--By the conclusion of this grant cycle, activities of the CREATE Consortium will be self-sustaining, institutionalized and widely disseminated. Dissemination will focus on presentations and web activities. The campuses will fold costs into existing budgets or secure needed funding locally.

5.1 Web Communication: Webmaster for CREATE web site/s. Check and respond to email each day. Update and add materials to resource area of site. Maintain web calendar and event announcements. Monitor and modify database system. Maintain remote, vpn, and ftp access to site support staff. Maintain servers that support the CREATE web sites. Implement flash movie tutorial area of the site for dissemination of CREATE materials. CREATE new web pages to support the goals and objectives of the grant.

5.2. Mentoring and Dissemination: Mentor other partnerships in California and the U.S. In

California, hold joint community college professional development

a. In the U.S. conduct targeted mentoring and professional development to disseminate the development of the transportable elements of successful education-industry partnerships

5.3. ATE TV joint venture with CREATE to develop a series of high quality videos on women and underrepresented populations in renewable energy careers which will then be used as recruitment tools by all three sites at tv.org and www.create-california.org

Summary

The CREATE consortium, a joint effort between community colleges, universities and high-tech engineering technology employers is current in its fifteenth year of operation. This paper highlights the accomplishments of the past year (2010/2011) as an NSF ATE Regional Center. Through its programs and commitment to partnerships, the CREATE consortium has had a significant impact on students, faculty and colleges in its region. The CREATE Center continues to operate in its ninth year as an NSF ATE Regional Center. Further information on CREATE can be found on our website at: <http://www.create-california.org> .