

Grant Proposal

Education & Career Center
West Valley Campus
Division of Adult & Career Education
Los Angeles Unified School District

SETI

Science & Engineering Technical Institute

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Proposal: Science and Engineering Technical Institute (SETI)

Overview

This proposal seeks to increase the number, diversity and preparedness of high school and community college students pursuing science and technology occupations, and to better meet regional occupational needs. The Science and Engineering Technical Institute (SETI) seeks to accomplish this goal through four specific measurable areas:

1. Provide students authentic "hands-on" educational experiences that relate to the needs of regional industry.

2. Provide professional development opportunities for technical faculty to develop, up-date and certify knowledge within industry and its related enabling technologies, software and hardware.
3. Articulate explicit connections between state education standards and the needs of regional industry within the curriculum.
4. Connect classroom activities directly to instructional trips to regional manufacturing facilities, and architectural sites of interest.

Meeting Industry Demand

Chryssolouris & Mavrikios state, "the development of educational curricula has not kept pace with either the growing complexity of industry or the economy, and even less with the rapid advance of new technologies" (2006). Statistics indicate that science and engineering fields will need more skilled technicians than are currently available. (Grey, 2008). The creation of a Science and Engineering Technical Institute (SETI) at the Education & Career Center, West Valley Occupational Campus would provide a clear pathway for the recruitment and development of skilled technicians. SETI will offer an articulated, hands-on program working with a wide range of subjects and technologies in an effort to increase both the academic and technological literacy of the student.

The focus of the SETI program is to become the pathway for high school students and adults from the surrounding community to develop industry-level skills for a variety of technical positions. Meeting the future demands of industry would require that SETI provide:

- 1) Authentic, hands-on, real world projects that engage students and benefit the community.
- 2) A simulated work environment with beginner, intermediate, and advanced courses.
- 3) An Advisory Committee of local professionals, school administrators, and instructors.
- 4) Up-to-date training for instructors to maintain the relevance and currency of their skill set.

CTE for the Green Economy

Now more than ever the transition to a more sustainable economic model is at the top of city and state goals. President Obama has proposed a comprehensive renewable energy plan setting aside \$40 billion out of a \$787 billion dollar plan (Silver 2008). But how attainable is that goal without the necessary trained individuals to achieve it. It is SETI's goal to ensure that we will have trained individuals to fill those jobs of the future. At SETI, we will ensure that individuals gain valuable training developing green technologies for engineering and designing of sustainable environments.

Key language, math, and science content standards for the state of California are currently integrated with the curricula at West Valley. Additionally, these academic standards are coordinated with project-based curricula designed to develop specific industry-level skills in Architecture or Engineering. While studying these projects, students will perform exercises in simulated working conditions to achieve real world results. SETI's goal is to create a learning environment that asks the students to exercise collaboration, and to use interpersonal communication to accomplish project goals. With the creation of SETI, a progressive series of courses could effectively develop the necessary skills to join industry or continue with a program of study for a two or four year degree. These courses would employ the latest industry design software and a blended course format. By completing a certificated program of study at SETI, students will establish a sound academic and technical background preparing them for entry-level employment or for continuing education at the community college or university level.

The technical instruction and training provided at SETI is to be relevant to current industry standards and anticipate future trends. This is achieved through the Advisory Committee meetings and time spent on-the-job within industry for the instructors. By spending time on the

job, instructors learn about the current technologies and work flows currently in use. This experience can then be integrated with the curricula through revised project goals, results, and instructions. To reduce interruption of classroom operations, time on the job can be scheduled for temporary and recurring periods with selected companies. The Advisory committee could identify companies willing to participate and establish the agreement and guidelines for on-the-job instructor training.

With sound academic and technical training in the fields of Engineering and Architecture, SETI can bridge the gap between the need for skilled technicians and the Green jobs of tomorrow.

Authentic Experiences

Many of the technical positions in demand include those requiring design and analytical skills for either engineering or architectural projects. Indeed, much of the civil infrastructure throughout the United States is in need of modernization. SETI can address the need for these skills by administering Engineering and Architectural design courses founded on project-based curricula. Students can complete a certificated program of training that both satisfies state academic content standards and develops industry-level skills for entry-level employment. Real-world projects can be integrated with the curricula to provide the hands-on simulated work experience. These real-world projects could be local community organizations in need of preliminary architectural plans or designs. The experience would provide students with relevant work experience and an opportunity to be connected with their community. The current development " [Lowe's Green Garden for Canoga Park HS](#) is an example of science and technology student collaborative design for the community.

Part of the SETI facility will be dedicated to a technical shop area with Computerized Numerically Controlled (CNC) and manual machine tools. This area, in addition to being open to education in the programming and use of current CNC technology, would also be available for community projects. This facility will allow students to design and manufacture prototype mechanisms for the community. The for-profit model of "Tech Shop" in Menlo Park, California provides an example of a membership-based workshop that provides access to modern CNC machine tools and instruction for a fee. (<http://www.techshop.ws/>) A similar structure for individual projects and support for community projects would be governed by the administrative board of SETI. A balance between educational value and community needs will guide the board's decisions in the scheduling of shop time.

Seeing is Believing

According to the California Industrial and Technology Educators Association, "Interest in and commitment to education increases as the relevance and application of academic concepts to actual careers becomes apparent to students through applied and integrated instruction." Connecting the education students receive at SETI to the reality of industry is an important aspect of the SETI program. Mechanical design coursework is to be directly observed and connected to an example of manufacturing machine parts during a visit to the Haas factory in Camarillo. The Haas factory is the second largest machine shop on the west coast of America and manufactures high quality Computerized Numerically Controlled (CNC) machine tools. CNC programming and tooling options are to be made relevant by observing that code in action on the SETI shop floor and during local industry visits. SETI's curriculum builds on traditional academic coursework and connects it to the real world. The SETI curriculum wants students to

see the true purpose for their study, a school to career connection, and to become self-advocates for their own education. To build confidence by showing students what can and is being done.

Instructor Development, Curriculum Relevance and the Advisory Committee

One of the key factors in the decline of what was called Vocational Education, then Industrial Education and what is now Career and Technical Education (CTE) is the inability of the educational system to keep pace with the rapid changes in technology and industry. The technical instruction and training provided at SETI is to be relevant to current industry standards and anticipate future trends. To ensure that SETI remains on the cutting edge of instruction and technological relevance, SETI proposes an exchange agreement with selected regional industry and community partners. These exchange agreements would allow faculty to work on current private industry and or city and country civil projects, and to observe and advise as circumstances merit. SETI is proposing a return to the practice of an unpaid sabbatical for the professional growth of the faculty. Faculty are to be encouraged to return to the private sector for a specified period of time and allowed to return to their teaching assignment with no loss of seniority or benefits. This allows the faculty to connect with the needs of industry, to develop curriculum that is relevant to the needs of industry while maintaining ties to SETI. The instructor's experience can then be integrated with the curricula though revised project goals, results, instructions and curricula. To reduce interruption of classroom operations, time on the job can be scheduled for temporary and recurring periods with selected companies. The Advisory committee could identify companies willing to participate and establish the agreement and guidelines for on-the-job instructor training.

Industry relevance is also to be achieved through the Advisory Committee meetings. This committee is to be made up of industry professionals, SETI faculty and administrative

representatives. This committee will serve to advise SETI on curricula and industry needs; and based on these committee meetings, general guidance as to future funding and allocation of that funding can be made by the SETI administration and faculty. The Advisory committee will also identify companies willing to participate and establish the agreement(s) and guidelines for on-the-job instructor training.

SETI also plans to maintain its relevance to industry and its connection to the community through bi-annual Advisory Committee meetings to ensure that both state education standards and industry needs are being met by the established curricula. This Advisory Committee would be made up of members of the school faculty, administration and counseling, local businesses, surrounding high schools and community colleges. The meetings could be used as a forum to address revisions to the curricula, learn about current industry trends, and better prepare students for continuing education. Counselors at the West Valley campus could provide informative presentations to local schools to motivate interest and draw a diverse student population into the institute's Architecture and Engineering courses. Focus will be given to bringing women and the socioeconomically disadvantaged into this science and engineering focused program. This provides an early start on their CTE pathway and also can provide training to recently unemployed or underemployed technicians.

Another aspect of the program would involve reciprocal agreements. These agreements could be developed between SETI and local colleges to give students community college credit for work completed at the B or better performance level, prior to entering a program of study for a two or four year degree.

What We Need

In order to provide an authentic real-world experience, SETI needs funding to establish a training center of computer labs, software, work areas, and any other facilities deemed necessary by the institute to support the success of the program. The simulated work environment would support a computer lab for both the architecture and engineering courses complete with all the latest computers, network hardware and furnishings found in a typical professional setting. This program will require broadband (high-speed) Internet connection access to promote collaboration among students, educators and business representatives. High-speed servers will also be required to store and share student work and to efficiently manage workflow by both faculty and students. These facilities would also include a technical shop area where modern CNC and manual machine tools used in prototype manufacturing would be located, as well as workstation class computers for design evaluation, visualization and programming. Students would develop industry-level skills through a series of courses designed to address these skills from fundamentals through increasingly more complex and advanced skills.

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