

Out of School - Engineering Challenges ETIC Funding Proposal Summary for Oregon Pre-engineering & Applied Science Biennium from July 1, 2009 to June 30, 2011

Program Elements

Program provides seed funding to School Districts agreeing to match funds and sustaining support for establishing an after school program for teams of students to compete in state wide engineering challenges. Program is modeled after High School athletics with the following key elements:

- Head Engineering Coach selected by principal and paid by a performance based extra duty stipend
- Engineering Challenge is organized and hosted by a state wide group typically affiliated with a national organization. Coach workshops, engineering kits, publicity, websites, fee collection, literature, etc. are expected from these organizations.
- Initially 3 types of challenges (like separate sports) are envisioned, a Computer Programming Challenge (e.g. ???), a Design Challenge (e.g. MIT InvenTeam, or IEEE's Design Squad), and a Robotics Challenge (e.g. FIRST Robotic Challenge or FIRST Tech Challenge). An Assistant Coach may be recruited for a specific challenge, and challenge "season" typically lasting a school term (10 to 15 weeks)
- Parent booster clubs, adult volunteer mentors, summer camps, coaching councils, and other supporting groups are expected to develop like established athletic programs.
- Active student participants are expected to be awarded an Engineering Letter, similar to Letters awarded for athletic or band participation.

Seed funding will be granted based on an application process defined and administered by OPAS. Funds will be available to match extra duty stipends and for needed materials and fees to participate in the initial challenges. School district budgets, parent fees, and fund raising are expected to sustain engineering challenge participation in much the same manner as High School athletic programs are funded today.

Delivers better prepared and more motivated college freshman

The success of the FIRST Robotic Challenge of motivating students to choose and succeed in graduating with a college engineering degree has been well documented by that group (see: FIRST website). After school engineering challenges provide students an opportunity to be a contributing member of an engineering team doing real engineering. Appropriate challenges are structured to be a rewarding experience for all participants while providing opportunities to apply and increase knowledge of engineering principals. Many secondary benefits such as contact hours with adult professional engineers and additional scholarship opportunities are expected from students who elect to participate on an engineering team further increase motivation and preparation for future engineering study.

Sustainable Systemic Change

This proposal is structured to as a seed program, requiring school districts to commit to completely fund the program after two years for a minimum of two additional years. It is expected that 4 years will be sufficient time for a Head Engineering Coach to develop a sustainable program, supported by parent booster clubs and even local industry that will be benefiting from engineering graduates. While most coach training will be developed and delivered by the organization sponsoring the specific challenge, training for head coaches in how to establishing an engineering program will be developed through an Engineering Coaches council. The cost estimated at 1250 per participating school. This cost needs to be added to the proposal.

Quantity, Quality, and Diversity & Staging Growth

Funding is being requested to seed about 100 or half of Oregon's schools over 3 biennium's. The selection of these schools will be done through an OPAS administered proposal process following criteria approved by ETIC. It is recommended that the initial 30 schools be chosen to ensure representation from a diverse set of schools. This will maximize learnings from the seed funding on elements that work and elements of the program that need modification to establish sustainable engineering challenge programs at the selected High Schools.

Some school districts will elect to start engineering challenges at all High Schools at the same time, while other school districts will want to start with a single school. Some requirements to consider in selecting schools include:

- Does the school curriculum include some type engineering, such as computer programming, drafting with design, or electronics?
- Can the school identify a head engineering coach?
- Does the school already have an after school activity program?
- Size of school, students from rural or city area, ethnic groups served by school, percentage of graduates that pursue college degrees, ETIC company in the area

Some school districts may elect to develop OST engineering challenge w/o seed funding, while other schools may require more or extended seed funding. There may be additional funding sources to support these needs as there are for schools that need help sustaining athletic programs.

Qualities for delivering the program

This program primarily requires schools and school districts to provide the infrastructure to support an OST engineering challenge program staffed by qualified and motivated engineering coaches. Additionally the program depends on other organizations to organize and host appropriate challenges. Appropriate challenges will be based on team engineering experiences that also show the relevance of engineering to solving current world problems, improving quality of life, or making life more enjoyable. Organizations should have ties to a national group that develops the challenges, materials, training, and metrics that measure success in better preparing and motivating the types of future engineers needed by ETIC companies.