### Project Title: Evaluation of VREP High School Engineering Intervention

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Thrust Area: Design Education

**Need and Industrial Relevance**

We need more STEM employees. The high-school initiative VREP has succeeded anecdotally, but has no hard data. If it succeeds, it would be a model for growing STEM education and creating future employees. Let's evaluate.

**Approach and Methods**

This project will collect data from a sample of the more than 50 schools participating in VREP, including student transcripts, GPAs, college enrollment status, demographic information, and other relevant variables.

*Permissions to use these data are already in place.*

A web-based database of anonymized student data will be created. Researchers will compare VREP graduates' attainment in undergraduate engineering with attainment of demographically similar non-VREP students to establish the impact of this high school intervention on engineering proficiency.

To build relationships between VREP students and partner companies, VREP Showcase events (annual gatherings of students) will feature visits by company representatives.

**Objectives**

This project will evaluate VREP's impact on students on a number of factors:

- Does VREP lead to higher GPAs?
- Does VREP lead to enrollment in the college-bound math and science tracks?
- Does VREP lead to enrollment in higher tier colleges?

We will also seek the critical factors for VREP success: demographics, environmental variables, race/ethnicity, rural vs. urban school, gender mix, etc.

**Impact**

Significantly expand research on techniques for engaging youth from diverse backgrounds with STEM education. Address two of the Grand Challenges for Engineering ("Advance Personalized Learning" and "Enhance Virtual Reality"). Demonstrating the robustness of VREP will provide evidence for an alternative schooling model.

**Outcome/Deliverables**

- **Evaluation of VREP**, a publication-quality report noting the critical characteristics for success with statistics and thorough data analysis.
- **Guide to a Successful VREP**, a practical handbook with suggestions for implementation of VREP and related similar programs
- **Heightened industry relationships** between students and partner companies

**Project Goals**

VREP (Virtual Reality Educational Pathfinder) enrolls students in over 50 schools in a self-paced, teacherless course in which they use peer-mentoring and the Internet to learn how to create and animate 3D models. Their projects must be designed with a school teacher as the "customer," e.g. the project will be used in a class. This research seeks to validate VREP's success quantitatively and explore how VREP could scale to larger numbers and to other skill areas.

**Project Duration**

3 mos 6 mos 9 mos 12 mos

| Tasks 1, 2, 3 in parallel | Task 4 | Task 5 |

**Proposed Budget**

$48,000 for graduate student, travel, and hourly database development.