Training Secondary Teachers to Deliver Design-Based Engineering Instruction

The University of Texas at Austin

Project Partners

- **A Unique Partnership**
  - UTeach + Austin

UTeachEngineering is increasing the strength of one MSP project partners in expanding the successful UTeach model for preparing and supporting secondary teachers of engineering.

In-Service Teacher Programs

- **Professional Development Program**
  - Engineering Summer Institute for Teachers (ESIT)
  - Pre-Service Teacher Program
    - Engineering Fundamentals and Design Knowledge
    - Student Autonomy for Learning
    - Student Responsibility for Learning
    - Content Knowledge
  - Ongoing Interaction with Teachers
    - Online collaboration: Tool UTeach
    - Pre-Service Teacher Program: Connect for Math and Science
    - NSF/Co-CG 
    - Engineering Summer Institute for Teachers (ESIT)
    - New High School Engineering Course
    - Service Teacher Recruitment
  - Early Results
    - Figure: Pre-Service Teacher Program

Pre-Service Teacher Programs

- **Pre-Service Teacher Program**
  - Pre-Service Teacher Program
  - Early Results

Curriculum Development: High School Course

- **New High School Engineering Course**
  - District wide implementation in Austin ISD (planned for 2010–11)
  - Teacher hiring plus networking group (underway)

Curriculum Development: University Courses

- **University Courses for Future Teachers**
  - Pre-Service Teacher Program
  - Early Results
  - What We Hope to Learn From Other MSPs

Project Goals and Progress To Date

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  - In the project's first year, UTeachEngineering worked with 54 in-service teachers to:
    - 26 Voltage (5th–8th grade) teachers earned the Title I MSP designation.
    - 20 mathematics and engineering teachers.
  - Early indicators of improved teacher quality are outlined in the "Early Results" section of this paper.

Pre-Servic Teacher Program Participation

- **Pre-Servic Teacher Program Participation**
  - Table: Pre-Servic Teacher Program Participation

Project Challenges

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  - Some of the challenges faced by UTeachEngineering are common among other teacher development programs, while others are unique results of the project's focus on the relatively new area of secondary engineering education.

What We Hope to Learn From Other MSPs

- **What We Hope to Learn From Other MSPs**
  - After summer professional development activities have concluded, how do you continue to engage, support, and interest with teacher participants? What types of support are provided by the IHE? By the CPS?

Results Observations (UTOP)

- **Results Observations (UTOP)**
  - Table: Results Observations (UTOP)

Early Results

- **Early Results**
  - Table: Early Results

Students rated their engineering courses as significantly more constructive than their science courses in all subareas. These data confirm the UTOP observation data.

Students' engineering knowledge gain is statistically significant after intervention. Teachers are participating in UTeachEngineering showed a statistically significant increase in engineering design knowledge after intervention.

Results Student Survey (OES)

- **Results Student Survey (OES)**
  - Table: Results Student Survey (OES)

Results Teacher Survey (ATS)

- **Results Teacher Survey (ATS)**
  - Table: Results Teacher Survey (ATS)

Results Teachers' Engineering Design Knowledge

- **Results Teachers' Engineering Design Knowledge**
  - Table: Results Teachers' Engineering Design Knowledge

Our project team members look forward to planning insights into how other MSPs have addressed challenges, particularly in these areas:

- After summer professional development activities have concluded, how do you continue to engage, support, and interest with teacher participants? What types of support are provided by the IHE? By the K-12 district partner? What have teachers found useful?
- If you received interest in your programs from prospective partners before you were ready to deploy, how did you keep those partners engaged until full collaborations became possible?
- How are you utilizing your Advisory Board? What lessons have you learned? What recommendations do you have for an MSP that is just coming to its Advisory Board?