Science Learning through Engineering Design (SLED)

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Team

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- Senior Personnel – Dan Tyrie (Plymouth), David Notary (TSC), Jim Lehman, Todd Kelley, Johannes Strobel, Courtney Brown
What is MSP?

“A major research and development effort, the MSP program responds to concern over the performance of the nation's children in mathematics and science. Institutions of higher education partner with K-12 districts and others to effect deep, lasting improvement in K-12 mathematics and science education.” started 2002

* Partnership-Driven
* Teacher Quality, Quantity and Diversity
* Challenging Courses and Curricula
* Evidence-Based Design and Outcomes
* Institutional Change and Sustainability
Overview of the SLED Partnership

Our aim is to increase grade 3-6 student learning of science by developing an integrated, engineering design-based approach to elementary school science education.
If given the necessary tools and resources, cross-disciplinary support, and instructional time, could elementary/intermediate school teachers (grades 3 – 6) effectively improve students ‘ science achievement through an integrated curriculum based on the use of the engineering design process?
SLED School Partners

- Lafayette School Corp.
- Tippecanoe School Corp.
- Taylor Community Schools
- Plymouth Schools

Industry Partners
SLED Partnership Goals

1. Create a partnership of university engineers and scientists, teacher educators, school teachers, school administrators, and community partners to improve science education in grades 3-6 through the integration of engineering design in science teaching and learning.

2. Enhance the quality and quantity, and diversity of in-service and pre-service teachers prepared to utilize engineering design as a means to teach science through authentic, inquiry-based, multi-disciplinary, design projects (TQ).
SLED Partnership Goals

3. Adapt, refine, and test existing project- and design-based curricular materials/tasks, and where necessary develop new ones, to support the teaching of elementary science through authentic, inquiry-based, multi-disciplinary, design projects.

4. Generate evidence-based outcomes that contribute to our understanding of how teachers teach science through the engineering design process and how young students effectively learn science concepts through design-based activities.
Timeline

- **Years 1 and 2**
  - Development and integration of engineering design-based activities for grades 5 and 6.

- **Years 3 and 4**
  - Development and integration of engineering design-based activities for grades 3 and 4.

- **Year 5**
  - Expansion of the partnership and integration of engineering design-based activities for grades 3 – 6 in all schools.
Current progress and accomplishments

• Implemented management structure (school & industry partners, STEM faculty, SLEDhub cyber-infrastructure)
• Developing SLED Summer Institute Program
• Developing SLED Preservice Teacher Program
• Generating standards-based, grade appropriate design-based science tasks
• Piloting and employing all research measures
Challenges

- Assisting STEM faculty in building an understanding of the Indiana Science Academic Standards
- Establishing a unified conception and model for engineering design-based science
- Teachers’ orientations towards and varying implementations of design
- Project management details including hiring Project Manager
Purdue Participation in SLED

Four Colleges: Education, Engineering, Technology and Science

Twelve Programs: Earth & Atmospheric Sciences, Chemistry, Biology, Engineering & Computer Engineering Technology, Civil Engineering, Biomedical Engineering, Curriculum & Instruction, Materials Engineering, Organizational Leadership and Supervision, Engineering Education, Industrial Technology, Chemical Education

Seventeen Purdue Faculty
Beginning Month 6 at the DLRC

So far, we have received clerical, event, financial, organizational, travel, logistics, presentation and many other forms of support from

- Joanna Allen
- Willie Burgess
- Amy Childress
- Cheryl Drake-Smith
- Chris Ramsey
- Laura Warner
- Gabriela Weaver
Next steps

**Summer 2011**
- Focus on SLED Summer Institute Program
- Work with evaluator to begin formative evaluation process

**Fall 2011**
- Facilitate External Advisory Board Meeting
- Pilot elementary science methods course
- Employ all research measures
- Facilitate SLED Follow up sessions