Session Title:
*Engineer Your World:* Formative Evaluation of a Project-Based High School Curriculum

MSP Project Name:
UTeachEngineering

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Feedback Session

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Summary:
UTeachEngineering is expanding the national network of high schools offering its project-based engineering design and problem solving course, Engineer Your World. To inform the evolution and continuous improvement of the Engineer Your World curriculum, UTeachEngineering has commissioned an external evaluation. This will include an expert panel review to address the quality of the intended and enacted curriculum. Questions to be addressed in this interactive session include: (1) What are the essential components of the curriculum that experts should have at hand in order to provide meaningful formative feedback?; and (2) What kind of information would high school administrators and teachers need to have in order to determine whether Engineer Your World is appropriate for their school?

Section 1: Description of product, tool, process, curriculum, or instrument:
*Engineer Your World* is a one-year high school engineering course focused on design and problem-solving. The curriculum seeks to fill a national need for a high-quality, low-cost, design-based engineering course that can be implemented in a variety of settings and that serves student learning by: 1) raising awareness of engineering (e.g., what it is, what engineers do, and the role engineers play in shaping the world); 2) engaging students in the engineering design cycle through a series of project-based learning experiences; and 3) developing specific knowledge and skills related to engineering design.

*Engineer Your World* was piloted with more than 200 students in seven Texas schools during the 2011-12 school year and refined based on teacher and student feedback. Twenty four teachers in eight states are implementing the course this year (2012-13) with approximately 800 students. (Teachers implementing in states other than Texas have been
paired with professional engineers who are acting as mentors for teachers and their students.) UTeachEngineering plans to extend the use of Engineer Your World to at least 200 schools across the United States in 2014-15.

Even as UTeachEngineering seeks to recruit more schools to offer Engineer Your World, we recognize that the curriculum must continue to evolve. (Moreover, there is growing interest among the current teacher users to extend the current curriculum to include a second year.) To this end, UTeachEngineering has engaged FACET Innovations to conduct a formal evaluation of the curriculum in 2012-13 and provide formative feedback to inform future development and revisions. The questions guiding the evaluation are:
1) What is the quality of the intended/written Engineer Your World curriculum?
2) What is the quality of support for teachers enacting the curriculum?
3) What are the short-term impacts of implementation? (e.g., classroom feasibility, teacher and student satisfaction, learning; school adoption).

Question 1 will be addressed through an expert panel review. A panel of four recognized experts in engineering education will use a protocol to examine and evaluate data packets consisting of curriculum samples and classroom artifacts (including student work and video clips).

Question 2 will be addressed through surveys and interviews with teachers and mentors (i.e., professional engineers paired with teachers in states other than Texas during the 2012-13 school year) as well as through a review of project records and research results. To answer question 3, we will draw on teacher survey and interview results as well as classroom artifacts and project research results.

Section 2: Question, issue, or challenge that is the primary focus of the session:
The expert panel review of Engineer Your World is the key component of the curriculum evaluation plan. Given that the experts engaged for this panel will have little or no knowledge of the project or curriculum, what are the essential components of the curriculum (written and enacted) that these experts will need to have at hand in order to provide meaningful formative feedback to the project? Additionally, what kind of information would high school administrators and teachers need to have in order to determine whether Engineer Your World is appropriate for their school?

Section 3: Types of people who you think might be most interested in discussing this and offering feedback:
PIs and project directors (as people who may have undergone, or may need to undergo, such a process of curriculum development); higher education STEM and learning sciences faculty (as people who may be called on to assist with curriculum development); K-12 administrators and teachers (as the ultimate consumers of a curriculum product); and evaluators (as people who may have led, or may need to lead, the evaluation of emerging curricula).
Section 4: How will you structure this session? What is your plan for participant interaction?
The session will include two brief interactive presentations, followed by a discussion period. The first presentation will provide a brief overview of the curriculum, its key features (e.g., learning goals, topics covered, cost) and history of development, including the challenges encountered and how these have been addressed. The second presentation will provide an overview of the curriculum evaluation plan, with primary emphasis on the structure of the expert panel review, including the protocol to be used and sample data packages (including curriculum samples, video materials and classroom artifacts). Participant comments and questions will be invited throughout the presentations. During the final discussion, we will ask participants to share observations, questions and comments regarding the data packages and suggestions for the refinement of the review protocol.