To Be or Not to Be (a research question)… That is the Question!

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Engineering Experiences for Rural 6-9th Grade Teachers and Students

***Cast of Characters** (who is involved and/or concerned)*

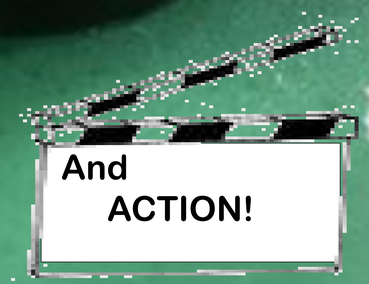
- *Rural Oklahoma 6-9 Grade Students*
- *Rural Oklahoma 6-9 Teachers*
- *OSU (Education and Engineering)*
- *State of Oklahoma*
- *EPSCoR*
- *NSF*
- *Dept of Education*
- *Engineering Communities*

***Setting the Stage** (motivation for study)*

To increase teacher knowledge of engineering
To have rural 6-9 grade students understand and consider engineering
To increase the number of students considering technical careers

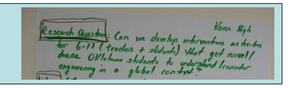
***Act 1 – Scene 1** (how this all got started)*

Application in March 2006
July 2006 ISEE Summit
Week long intensive workshop started off by determining research questions



First Draft of Research Question Monday 7/10/2006

Can we develop interventions/activities for 6-12 (teachers and students) that get rural/diverse Oklahoma students to understand/ consider engineering in a global context?



Way too general and big, it is not possible to focus on both students and teachers. How are we to measure appropriateness of interventions/activities? Is rural AND global too big? Rural is enough diversity?

Multiple Revisions During Research Question Session Tuesday 7/11/2006 Morning/Early afternoon

In what ways can we develop interventions/activities for 6-12 (teachers and students) that get rural/diverse Oklahoma students to consider engineering in a global context?

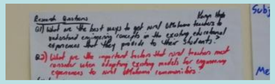
What interventions are appropriate for 6-12 (teachers and students) that get rural/diverse Oklahoma students to consider engineering in a global context?

What interventions do 6-9 grade teachers feel are appropriate to get rural Oklahoma students to be more aware of engineering?

What interventions do 6-9 grade teachers perceive are appropriate to get rural Oklahoma students to be more aware of engineering?

Getting better. The last question implies that teachers are aware enough of what engineering is to be able to figure out what interventions are appropriate. Are they confident enough in their understanding to do so?

Second Draft of Research Question(s) Tuesday 6/11/2006 Afternoon



TWO Questions Arose:

What are the best ways to get rural Oklahoma teachers to understand engineering concepts in the existing educational experiences that they provide to their students?

What are the important factors that rural teachers must consider when adopting existing models for engineering experiences to rural Oklahoma communities?

These questions look at working with the teachers to find engineering content in their curriculum. And, then to figure out what is out there and decide if it is appropriate for Oklahoma. Assumes teachers know engineering. Maybe not?

Third Draft of Research Questions Wednesday 6/12/2006

What methods are appropriate for rural Oklahoma 6-9th teachers to understand the existing engineering concepts in their current math and science curriculum?

What are the important factors that must be considered when adapting existing models for 6-9th grade engineering experiences to rural Oklahoma communities?

Really the same as 6/11 with better word refinement. Does focus on science and math teachers. The second question takes the burden off of the teachers since not explicitly stated "teachers must…." How do teacher know engineering??

***End Act One** (The final research questions? or more work to do?)*

Year One:

1. What do 6-9th grade rural science and math Oklahoma teachers know about engineering?
2. How does this compare to teacher candidates at Oklahoma State University?
3. How does this compare to other teachers that have participated in studies nationally?

Year Two:

4) How do these compare to other teachers in Oklahoma?
5) What methods are appropriate for rural Oklahoma 6-9th teachers to understand the existing engineering concepts in their current math and science curriculum?

Later:

6) What are the important factors that must be considered when adapting existing models for 6-9th grade engineering experiences to rural Oklahoma communities?

The Larger Question:

7) Can we develop interventions/activities for 6-9 (teachers and students) that get rural/diverse Oklahoma students to understand and experience engineering?

***Act Two** (Starting to answer the questions:)*

Cohort of teacher candidates Fall 2006 and 2007; 12 Teachers in 6-9 grade: Survey using ASEE, Arizona State University and my instrument, Working on qualitative measures. Compare to published results.

FINALE *(Hopefully sometime before I retire:)*