

Transforming CE 361: Introduction to Transportation Engineering to a Project-based Learning Course

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Why?

- Problem:
 - Declining workforce in transportation engineering.
 - Need to attract young talent and sustain youth's interest in transportation.
 - Problem-based and project-based learning courses typically introduced in the first and senior years.
- Educational Objectives:
 - Redesign *CE 361: Introduction to Transportation Engineering*, offered at the junior year, within a project-based learning (PBL) framework.
 - Provide students with real-life transportation projects and challenges to foster and maintain their interest in transp. eng.
 - Broaden students' perspective related to the social and environmental aspects of basic concepts in lectures.

When?



- Fall 2013
 - Implemented a problem-based approach when preparing in-class learning activities.
 - Conducted regular student assessments.
 - Students worked in teams (“learning partners”).
 - Students solved short real-world problems.
- Fall 2015
 - Will place students in the role of highway design and traffic engineers using real data to develop models and tools used in the design and operations of real-world transportation projects.



Where?

- Purdue University civil engineering juniors and seniors.
- CE 361 is offered as a technical elective, typically taught three times per week every semester.
 - *Monday session*: introduce main concepts.
 - *Wednesday session*: work on in-class problems and entertain questions; form teams.
 - *Friday session*: conduct the specified design or traffic study by collecting data in the field or at a computer lab.
- Depending on the topic, this schedule might be executed in two weeks instead of one.
- Students will be expected to interpret and analyze their data and submit a written report.

What?

- *Developed* board notes, learning objectives, in-class activities (problems and readings), visuals and videos on real-world examples, and student assessments.
- *Need to develop* PBL activities and materials: identify appropriate data and define study tasks, deliverables and student learning outcomes for each project.
- *Theory of change*: real-life transportation projects can improve students' understanding of the subject matter and help students relate course materials to practice.
- Activities that have worked well:
 - Learning objectives are an effective means to communicate expectations to students and hold them accountable.
 - Student assessments improve learning and development.
 - Teamwork results in better learning outcomes.

Prognosis?

- How are you documenting impact?
 - Student assessments and learning outcomes (short-run).
 - FE success rates (long-run).
- How do you plan to scale-up?
 - Incrementally increase the problem-based and project-based learning activities to most subject areas involved.
- What challenges are you currently facing?
 - Time, resources (data, help in the lab), logistics of field data collection.
- What advice would you like from others at FOEE?
 - Scale versus depth of activities.
 - Team composition.