Harnessing Theory in the Service of Engineering Education Research

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Agenda

- Goals and structure of empirical study
- Role of theory in systematic investigation
- Discussion
What are we doing?

- Education Research
- Computing & Engineering Education Research
- Computer Science Research
- Teaching and Learning Of Computer Science
What is the goal

Introspection  Scholarly discourse

Intuition  Evidence

Teaching Practice in our Discipline
Critical Aspects of CER

- Scholarly practice & reflection
- Student learning
- Disciplinary and general education research
- Development of learning env.
- Quality Framework
How?
Causal relations, prediction
- Positivism
- Post-Positivism
- Empiricism

Understanding, interpretation
- Constructivism
- Phenomenology
- Hermeneutics
- Post-Modernism
- Structuralism

Improvement, development
- Pragmatism
- Critical theory

Paradigms: ontological and epistemological assumptions

Data analysis methods

Data collection methods

Eric Bredo (2006)
Research purposes

RESEARCH PROBLEM

Theoretical
Personal
Institutional
goals

Research
questions / issues

Philosophical
assumptions

Paradigm
perspective
Methodological
choice

Validity
Credibility

Design
procedures

Typology
Data collection
methods

Data analysis
methods

Research outcomes

Synthesis:
Conclusions
and inferences
Crafting a CER Study

Diagram showing the relationship between syllabus & outcomes, relevant CE and EE research, theories of teaching and learning, student cohort, course instructional design, knowledge skills and competencies, evaluation framework, data collection, and analysis & reflection.
Questions and Discussion

Thanks for your attention!
Application

Course and curriculum design

Intended object of learning

Enacted object of learning

Learning activity

Lived object of learning

Learning situation
Intended object of learning

Enacted object of learning

Lived object of learning

Learning activity

Learning situation

Course and curriculum design

Constructive Alignment
An Example

- Students
- Teachers
- Curriculum
- Legitimation
- Values
- Regulation
- Enaction
Why? Quality and Sustainability?

Adapted from (Owlia & Aspinwall 1997)