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Using Phenomenography in Engineering Education

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School of Civil & Structural Engineering Research Seminar

Using Phenomenography in Engineering Education

Una Beagon

18th November 2019

Outline

Context to PhD Study

Research Questions

Research Methodology

Phenomenography and Phenomenology

Phase 1 Survey

Phase 2 Interviews

Adding to Scholarship

PhD Working Title:

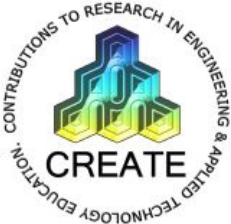
A phenomenographic study of academic conceptions of professional skills in engineering programmes in Ireland

Context – Industry background



Technical Skills
alone are not
enough

Context – Lecturer in TU Dublin



The ideal engineering graduate



Professional Skills

Critical thinker

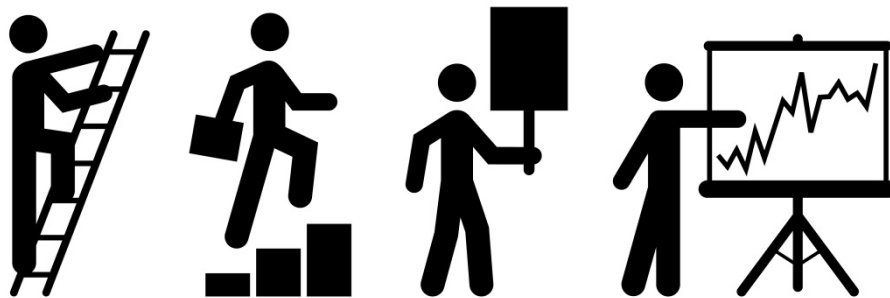
Team player

Good communicator

Self directed learning

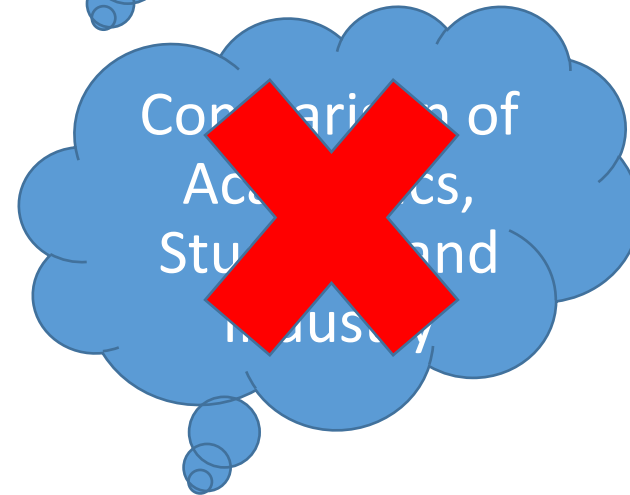
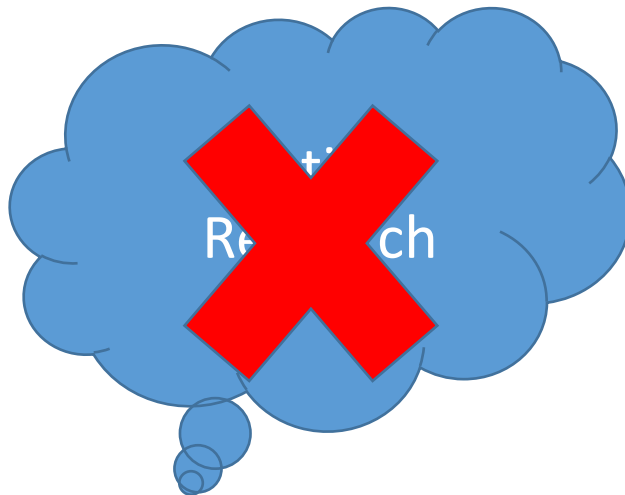
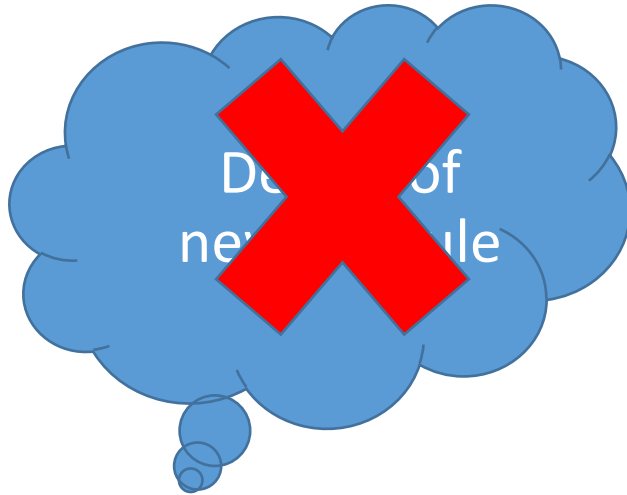
Negotiation skills

Leadership



Technical Skills

Research Work considered



Influences on curriculum design



Engineers Ireland

Programme Reviews (QA)

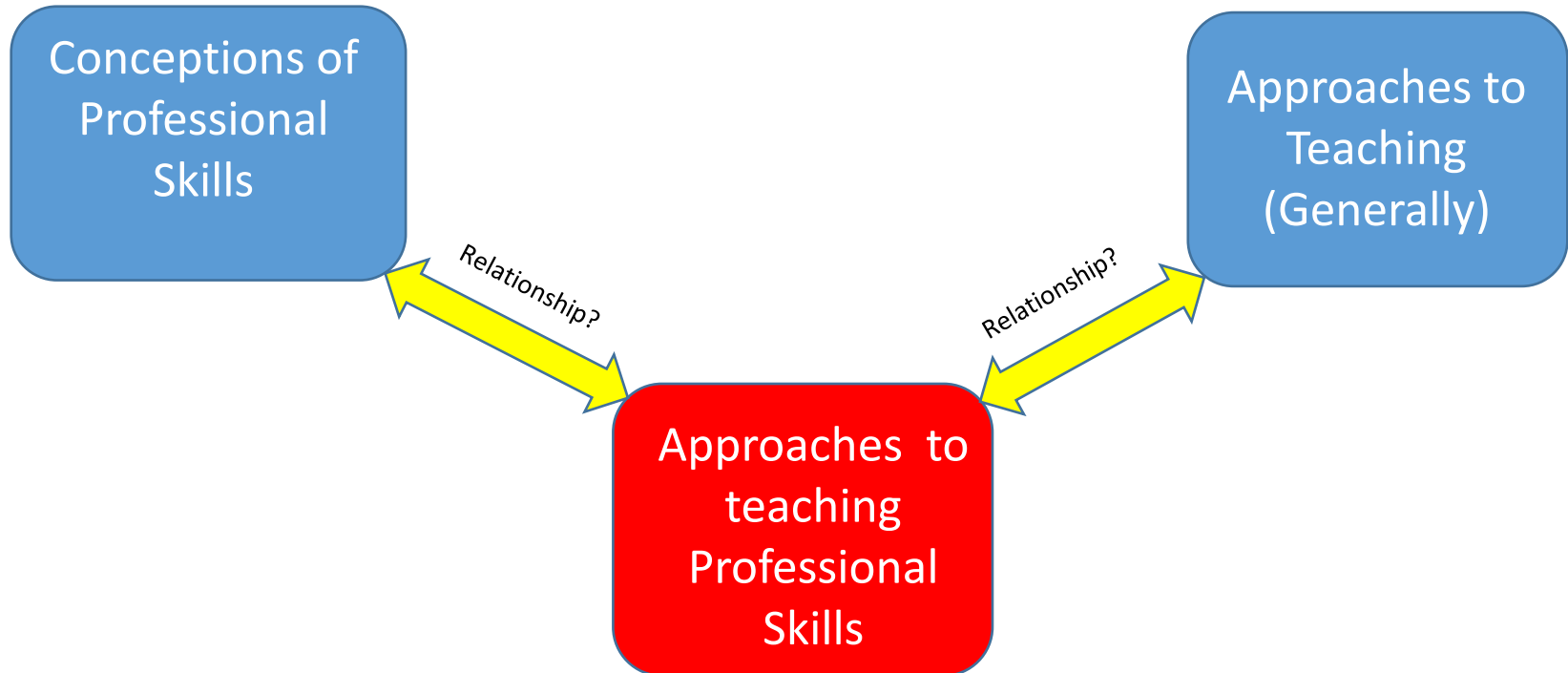
HEA compact

TU Dublin strategy

Industry views

Engineering
Academics

Research Questions





Research Design and Methodology

Literature Review

Phase 1: Online Survey

Purpose: To gather general information, provide data for triangulation and to provide purposeful sample for Phase 2 interviews.

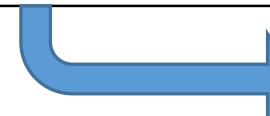


Phase 2: In-depth phenomenographic interviews (10-20)

Purpose: To collect the varied ways in which academics' experience or perceive the teaching of professional skills



Phenomenographic analysis of interviews to produce outcome spaces to inform a framework of variation in academic experiences



Framework

Phenomenography

First proposed by Marton (1981)

“Phenomenography is a research method adapted for mapping the qualitatively different ways in which people experience, conceptualise, perceive, and understand various aspects of, and phenomena in, the world around them” (Marton, 1986, p.31)

Examples :

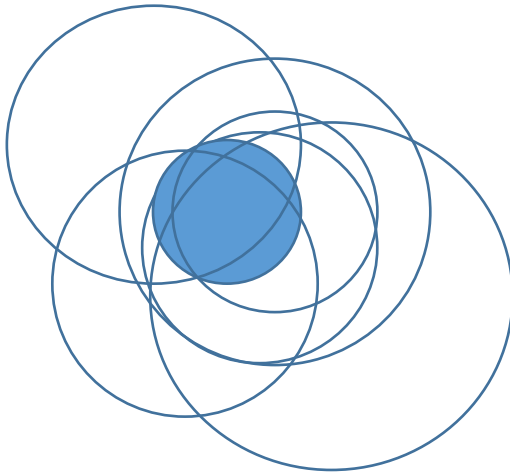
- Surface and deep learning (Marton & Säljö, 1976)
- Approaches to Teaching Inventory (Trigwell et al, 2005)

Phenomenography

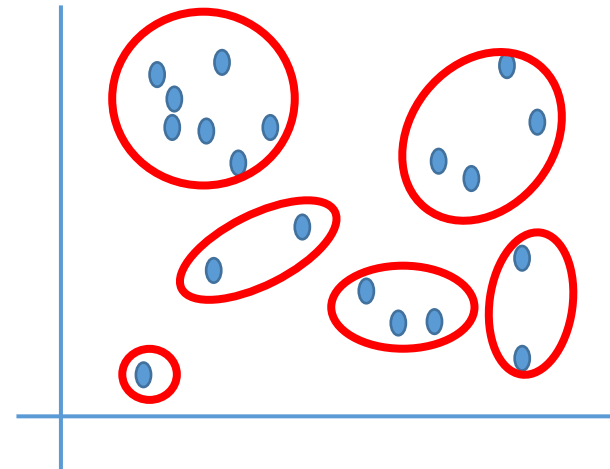
Phenomenology

v's

Phenomenography



Similarities

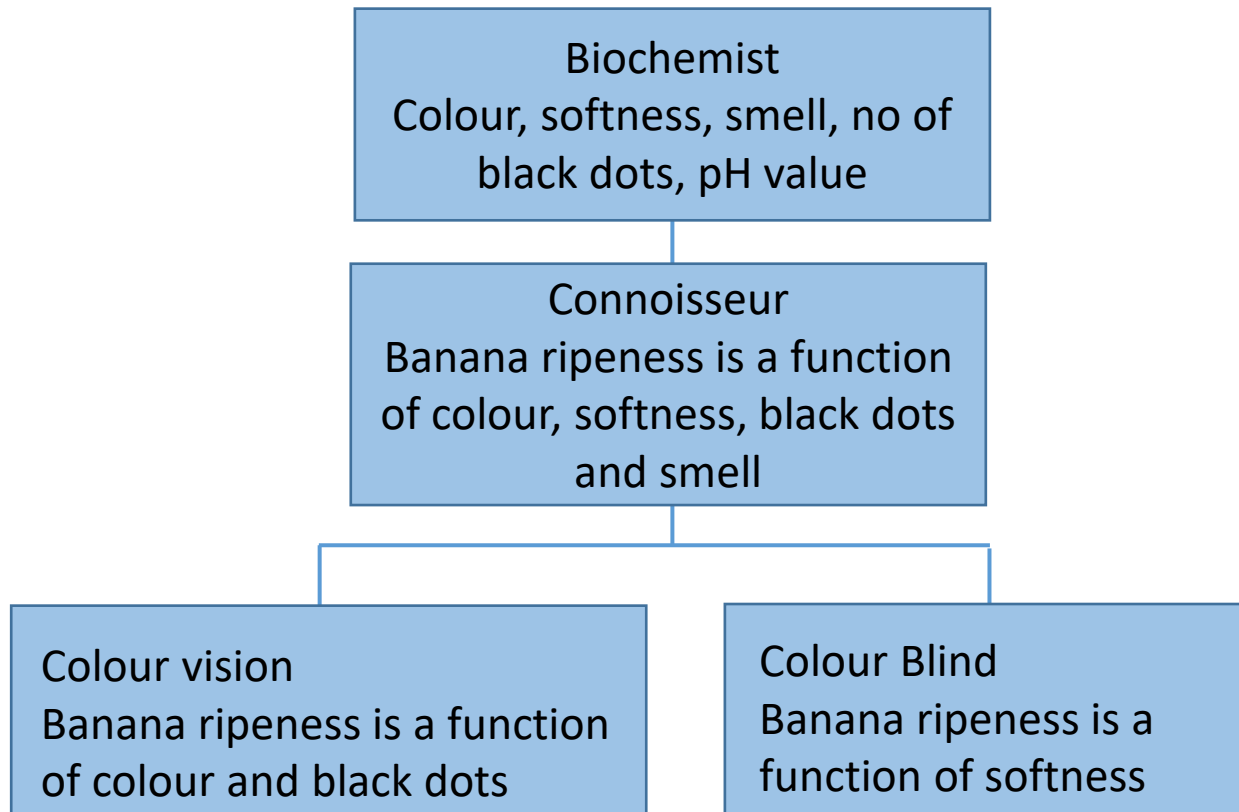


v's

Differences

Bananas

How do you describe a ripe banana?





Learning

“Learning in terms of changes in or widening of our ways of seeing the world can be understood in terms of discernment, simultaneity and variation” (Bowden and Marton , 1998).

Variation of views → Variation in people → Phase 1 Survey

Phase 1 Survey

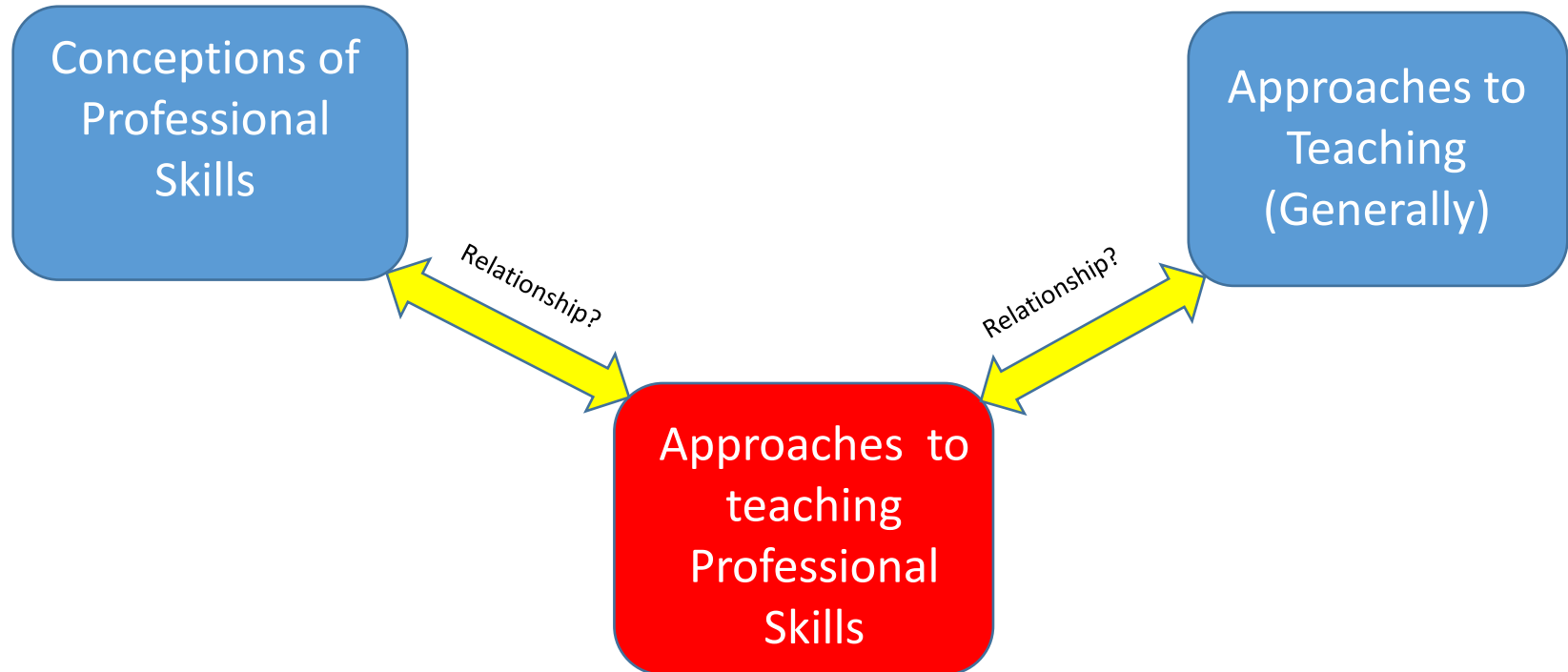


- Gender and Age
- Qualifications (academic & professional)
- Background Career (engineer or other)
- Industrial Experience
- Academic Experience
- EI Accreditation
- Ranking of skills required to make a good graduate
- Approaches to Teaching Inventory

Interviewee selection

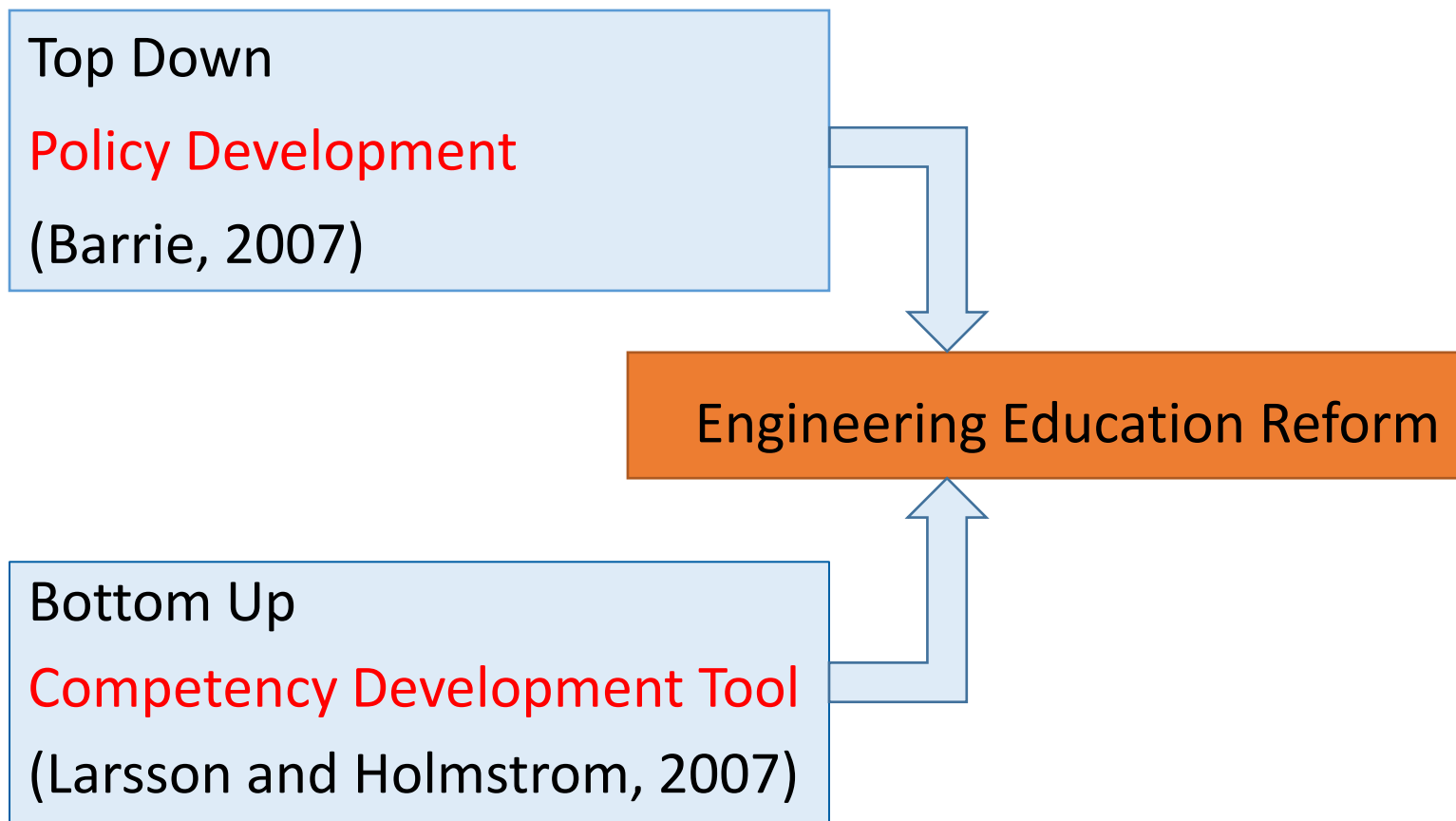
| Respondent D | P1 (Female) | P2 (No Industrial Experience) | P3 (>20 yrs industry) | P4 (Worked with graduates) | P5 (Outlier ATI results) | P6 (PhD) |
|--------------|-------------|-------------------------------|-----------------------|-----------------------------|----------------------------|-----------------|
| 6546217763 | | | P3 (>20 yrs industry) | P4 (Worked with graduates) | P5 (Outlier CCSF) | |
| 6487080580 | P1 (Female) | | | | P5 (Outlier ITTF and CCSF) | |
| 6551935959 | P1 (Female) | | | P4 (Worked with graduates) | P5 (Outlier CCSF) | |
| 6545611312 | | | P3 (>20 yrs industry) | P4 (Worked with graduates) | | |
| 6536058873 | | | P3 (>20 yrs industry) | P4 (Worked with graduates) | | |
| 6532813430 | | | | P4 (Worked with graduates) | P5 (Outlier CCSF) | |
| 6530132268 | P1 (Female) | P2 (No Industrial Experience) | | | P5 (Outlier ITTF) | |
| 6528333966 | P1 (Female) | | | P4 (Worked with graduates) | | |
| 6508432726 | P1 (Female) | P2 (No Industrial Experience) | | | | P6 (PhD or DEd) |
| 6508305707 | | | P3 (>20 yrs industry) | P4 (Worked with graduates) | P5 (Outlier CCSF) | P6 (PhD or DEd) |
| 6501015956 | | | P3 (>20 yrs industry) | P4 (Worked with graduates) | P5 (Outlier CCSF) | P6 (PhD or DEd) |
| 6500542113 | P1 (Female) | | | P4 (Worked with graduates) | | P6 (PhD or DEd) |
| 6490636805 | P1 (Female) | | | P4 (Worked with graduates) | | |
| 6489864197 | | P2 (No Industrial Experience) | | | | |
| 6480180134 | | | P3 (>20 yrs industry) | | | |

Interview analysis to answer research questions



What are the qualitatively different ways that academics approach the teaching of professional skills in engineering programmes in Ireland?

Adding to Scholarship



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Phase 1 Survey

Approaches to Teaching Inventory (Trigwell & Prosser, 2004)



Exercise

- Variation in approaches to teaching
- Context specific
- Teaching approaches v's student outcomes

Table II. Intention and Strategy Components for Five Approaches to Teaching (A–E)

| Intention | Strategy | | |
|--------------------------|-----------------|-----------------------------|-----------------|
| | Teacher-focused | Student–teacher interaction | Student-focused |
| Information transmission | A | | |
| Concept acquisition | B | C | |
| Conceptual development | | | D |
| Conceptual change | | | E |