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Engineering Skills Requirements: a Systematic Literature Review (2009-2016)

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UK and Ireland Engineering Education
Research Network





Spring Colloquium
Building capacity and growing collaborations

Friday, May 3rd 2019,
Grangegorman Campus,
Technological University Dublin

Proceedings

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EERN Network
Engineering Skills Requirements: A systematic literature review (2009-2016)



Presenter: Una Beagon
Supervisor: Prof. Brian Bowe

3rd May 2019

Outline



- 1) Aims of research
- 2) Methodological Approach
- 3) Results
- 4) Lessons learned

Aims of Research

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    A[Better prepare students for the workplace] --> B[Identify key skills requirements]
    B --> C[Literature Review]
  
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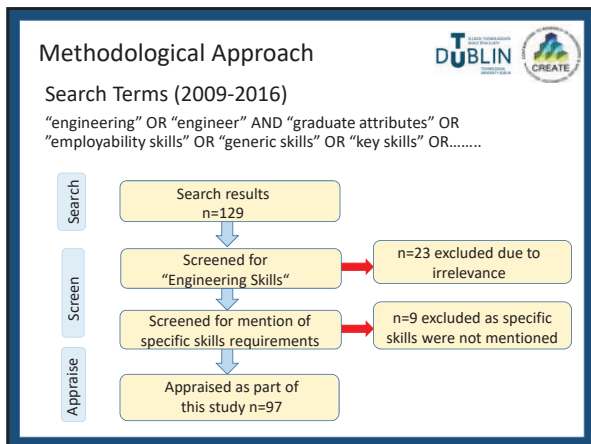
Literature Review

Markes I., (2006), A review of literature on employability skill needs in engineering, *European Journal of Engineering Education*, 31(6), pp. 637-650

The extent of literature published by variant organisations merely confused the definition of any skills

Holmes, L. (2013). Realist and relational perspectives on graduate identity and employability: a response to Hinchliffe and Jolly. *British Educational Research Journal*, 39(6), 1044-1059.

warns against presenting data analysis from such surveys in a statistical form, using means and standard deviations, when there can be considerable variation in the respondent's understanding of the question or meaning.

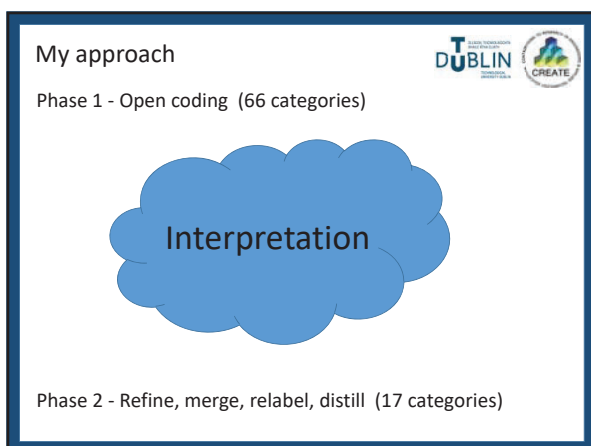


My approach

Limit interpretation → Simple count of no of mentions
 Positive and negative both equal

"However such teaching methods.....do nothing to develop transferable skills such as team working, communication skills or the ability to think 'outside the box'" (Bourn & Neal 2008 p.20)


"These students do not value the course's use of presentations in the development of their communication skills" (Bather, 2011, p. 212)



Overall Results – 17 categories


Category	No of sources which mention this skill	No of times this skill is referenced
Character and Interpersonal Skills	73	433
Teamwork / Groupwork / Collaboration	71	249
Communication	67	195
Technical skills	53	189
Problem solving	58	130
Business Acumen	46	111
Globalisation, Intercultural Skills	41	93
Self-Directed Learning/Independence	39	84
Project Management or Planning and Organisation	40	67
Leadership	33	54
Practical applications / Real life problems	21	37
Critical thinking	25	36
Research skills	24	31
Foreign Language skills	11	19
Risk Management	7	10
General Knowledge	8	10
Health and Safety	7	8

Results - Categories



Communication	Character and Interpersonal Skills
Oral Communication or Presentation skills	Ethics or Integrity
Written Communication	Creativity or Innovation
Listening	Social Responsibility
	Sustainability or Environmental awareness
	Adaptability
	Change Management
	Emotional Intelligence
	Attitude to work
	Self discipline
	Self reflection and analysis
	Enthusiasm Motivation Curiosity
	Professionalism
	Decision Making
	Grit Determination Perseverance
	Commitment
	Confidence
	Taking responsibility Ownership Accountability
	Self Awareness


Lessons Learned



- Keep a record of all steps in any research
- Interpretation is inevitable
- Descriptions are helpful
- Be wary of lists of skills!

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