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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

Table of Contents



	Page
Session 1.	3
Jane Andrews, Graeme Knowles, Robin Clark, University of Warwick, Roger Penlington, University of Northumbria: The great teacher training debate: how can colleagues be better prepared to teach in engineering?	
Una Beagon and Brian Bowe, TU Dublin: Engineering skills requirements: a systematic literature review (2009-2016)	7
Maria Kyne, Limerick Institute of Technology: Incorporation of the programmatic review and accreditation process in engineering education	10
Roger Penlington, University of Northumbria: Mapping the engineering academic career path.	15
Graeme Knowles, University of Warwick: The ‘Brilliant Jerk’ Test: Applying the principles of deliberately developmental organizations to develop the whole engineer	20
Keynote presentation	
Prof. Bill Williams (Associate editor of the Journal of Engineering Education and the European Journal of Engineering Education) Getting published: Interdisciplinarity and other challenges.	24
Session 2.	
Thomas Popham, Clare Lucas, University of Warwick: Data Science – What do all engineers need to know?	33
Alan Brown, University of Ulster: Effective active learning pedagogies in engineering: Just being active is not enough	38
Peter Johnson, Imperial College London: Case study of an authentic engineering problem solved as part of a first-year undergraduate laboratory session in fluid mechanics.	45
Stuart Grey , University of Strathclyde: Automated tools to bridge the gap between student comments and improved teaching.	48
Irina Neaga, University of Wales Trinity St David: Big Data in Higher Education: From the literature review to a conceptual framework	54
Session 3	
Nathalie Al-Kakoun, Patricia Xavier , Swansea University: Integrating social development into engineering education	58
Gabrielle Orbeak White, Swansea University: Addressing the diversity problem in engineering: Re-Imagining the research paradigm in engineering education research	60
Jeffrey Buckley, Tomas Hyland, Lena Gumaelius, Niall Seery and Arnold Pears, Athlone Institute of Technology, KTH Royal Institute of Technology, Stockholm, Sweden and University of Limerick: Engineering education research methods to determine conceptions of engineers and of engineering	64
Ed Byrne , University College Cork: Engineering education directions and progress	68
Diana Adela Martin, Eddie Conlon, Brian Bowe, TU Dublin: Surveying the state of engineering ethics education	73

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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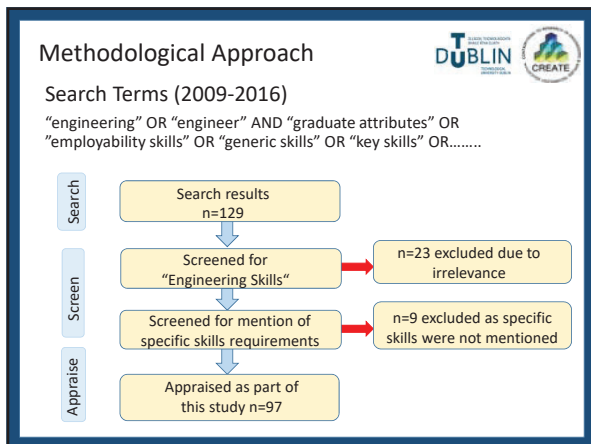
Literature Review

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.

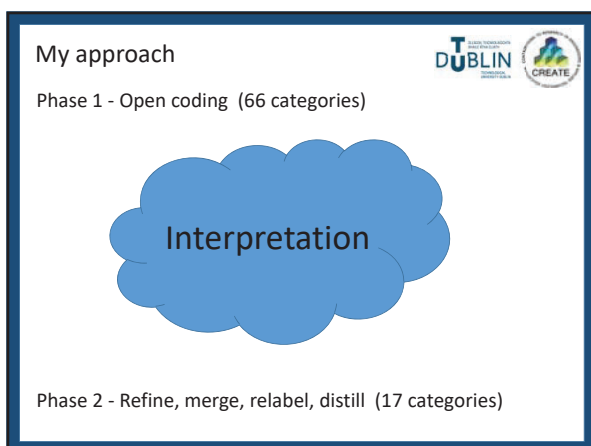


My approach

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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